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ANNUAL
OF THE
UNIVERSAL MEDICAL SCIENCES
AND
ANALYTICAL INDEX.

A YEARLY REPORT OF THE PROGRESS OF THE GENERAL SANITARY
SCIENCES THROUGHOUT THE WORLD.

EDITED BY

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AND

SEVENTY ASSOCIATE EDITORS,

ASSISTED BY

OVER TWO HUNDRED CORRESPONDING EDITORS, COLLABORATORS,
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SURGERY OF THE BRAIN, SPINE, AND NERVOUS SYSTEM.

BY THE CENTRAL EDITORIAL STAFF.

SUBMITTED FOR COMMENTATION TO

LEWIS S. PILCHER, A.M., M.D.,

ASSOCIATE EDITOR,

BROOKLYN.

BRAIN.

General Considerations.

IN a discussion before the French Surgical Congress, October 26, 1895, Doyen ³¹_{Nov. 6, '95} attributed the comparative rarity of surgical intervention in diseases of the brain to a want of certainty in cerebral localization and to defective operative procedures, which permit of exploring but a small portion of the surface of the brain. In order to judge of the extent of the lesions present in a certain case it is necessary to be able to completely explore the surface of the lobe. This he has successfully done several times. He makes a large flap from the occipital protuberance to the glabella, prolonging the incision laterally in front toward the zygomatic arch and backward toward the external auditory canal. By means of special burrs, worked by hand or by electric motors, he makes five or six incisions into the bone outside the superior longitudinal sinus, above the lateral sinus, and below the temporal fossa. He separates the bony septa obliquely so as to prevent depression of the bone when replaced in position. This method renders cerebral localization useless to the surgeon, it being only necessary to have some indications as to the side to be operated upon. The author has in certain cases been able to operate on both sides at one sitting. He regards the procedure as applicable to numerous diseases, and particularly to microcephalus and epilepsy.

Lannelongue and Maucclair, of Paris, ⁷³_{Oct. 20, '94; Nov. 11} describe a new method of cerebro-cranial topography in brachycephalic and mesaticephalic children, based on a study of fifty-two children from 2 to 14 years old. Their line of operation was an horizontal apophyso-orbito-supraprotuberantial curved line. It started from the superior external angle of the orbit and from the middle part of the apophysis; it came out behind on the sagittal line, above

the external occipital protuberance. This curved line was easily traced, according to Broca, who had advised placing the head in an horizontal position. Some writers, however, had differed with him in this respect, but Lannelongue and Maucelaire had not been able to follow their method, for, if the zygomatic apophysis were taken as a guiding-mark, this line was sufficient for practice. The anterior branch of the middle meningeal artery corresponded approximately to the union of the anterior tenth with the posterior nine-tenths of the authors' proportional line. According to them, the superior extremity of the fissure of Rolando among brachycephalic children was a centimetre and a half behind the mid-sagittal point. In order to ascertain the inferior extremity of this fissure, the point of junction of the anterior fifth with the posterior four-fifths of this proportional line must be found, and, at this point, a vertical line raised equal to this fifth. To ascertain the situation of the base of the third frontal circumvolution, near the point of junction of the anterior sixth with the posterior five-sixths of the proportional line, a vertical line equal to this sixth must be raised. Very near the top of this (within from three to four millimetres at least) Broca's centre would be found. In order to ascertain the region of the *pli courbe*, at the union of the anterior two-thirds with the posterior third of this proportional line, a perpendicular line equal to this third must be raised. At the top the posterior extremity of the posterior branch of the Sylvian fissure would be found. In puncturing this horizontal curved line near the external auditory meatus the sphenoidal cornu of the cerebral ventricles is penetrated. The recent operations of cranioplasty enabled them to raise large pieces of the cranium; so that rigorous procedures were not necessary in order to come within about a centimetre of finding any centre searched for. Among children these osteoplastic resections (which were of no use unless the lesions were extensive) should be replaced by a less rigorous intervention,—that is, by the application of the trephine in one or two places. The authors had been struck with the variations of length of the lines used. It showed that there existed individual variations which must be taken into consideration, and it also showed the fallacy of those procedures in which the guiding-marks were represented by absolute figures.

Giannelli ⁵⁹¹_{V.21, Nos.2,3; Nov.9, '95} ² gives the results of some pressure experiments on the brain of a woman, aged 33, who had been trephined over the middle of the ascending parietal convolution. In one set of experiments the pressure was increased gradually up to 20 centimetres Hg.; in the others, rapidly up to 18 centimetres. Similar symptoms were observed in each case except that they occurred

at once when the pressure was rapidly increased and gradually in the other class. The pupils contracted in the first series and dilated clearly in the second. It was not noticed which pupil altered first; the changes were equal. The pulse was at first slightly increased in frequency, but ultimately lessened, and the height of the pulse-tracing tended to get lower. The respiration, which was at first increased, speedily diminished, and it appeared that stimulation of the part of the cerebral cortex under observation exercised an inhibitory influence on expiration. No Cheyne-Stokes breathing was observed, perhaps because the pressure was not high enough. Pain in the head became intense at 14 centimetres pressure, unbearable at 18. Temperature in the rectum fell slightly under pressure, but rose to normal in a few minutes after the pressure was relieved. Salivation was often noticed. Drowsiness up to loss of consciousness was observed when the pressure was high. It was not possible to observe the optic discs during the course of the experiments.

Cotterill, of Edinburgh, ³⁶_{Jan., '90} contributes his experience with a method of trephining, in which the portion of bone which it is sought to temporarily separate is kept attached by a flap of scalp, so that it can be replaced with a reasonable prospect of its retaining its vitality and becoming again united to the bone from which it was removed. He showed at the society meeting a skull-cap from which a very large circle of bone had been lifted months before death, and in which complete union had taken place. In removing portions of skull it was advisable to saw obliquely inward, as thereby a beveled edge was left, on which the replaced portion of bone rested, and obviated the difficulty in preventing the removed portion from slipping below the level of the surrounding bone and pressing upon the brain. The method of operating was specially useful for cases in which exploratory operations had to be performed and in which it was desirable to replace the bone. F. Shoff, of Axtell, Neb., ¹_{Feb. 23, '90} calls attention to the method advocated by Pyle, of Canton, O., described in last year's ANNUAL (vol. iii, A-58), as covering all the claims advanced by Cotterill's method, and being much more simple.

Robert Abbe, of New York, ⁹⁶_{Sept., '90} employed subdural implantation of rubber tissue after trephining in a case which Græme M. Hammond regarded as one of cortical irritation in the hand-centre because of the uniform seizure of the hand first. Abbe made a large horseshoe-shaped incision with the chisel, exposing an area of dura about two inches in diameter over the hand-centre. The appearance of the dura was that of chronic pachymeningitis with unusual thickening. Two-thirds of a circle, an inch and a half in

diameter, was cut into the dura; the flap, which was firmly adherent to the pia and brain beneath, had to be dissected up and was turned back. The dissection was difficult, but was done without injury to the brain-substance. Radiating from the hand-centre, the dura was found less and less adherent. Feeling that if the parts were simply replaced and sutured adhesions would form again and the patient would not be permanently benefited, he thought of carrying out the method practiced by Beach, of Boston, of inserting a piece of gold-foil between the brain and dura. Not having any at hand, he substituted a piece of sterilized gutta-percha tissue an inch in diameter. Primary union took place throughout the depth of the wound. Aside from a slight seizure in the hand at the end of forty-eight hours, the patient had been entirely free from his attacks since the operation, a period of eight weeks. The medical treatment had not been different from what it was before the operation. As to the ultimate fate of the rubber tissue, his impression was that it would remain imbedded as a bullet might. The point to be gained was evidently limitation of local irritation in the hand-centre.

Von Eiselsberg, of Utrecht, and Fraenkel, of Vienna, reported to the German Surgical Congress ¹⁴_{Apr. 23, '05} several cases in which they had performed heteroplasty, replacing loss of bone-substance in the skull by celluloid plates. The results were excellent. The procedure is difficult, but may be successful in instances in which Koenig's method of autoplasty is not applicable, as when the loss of substance is too great or the patient too weak. In the discussion Czerny stated that he had only poor results from the use of celluloid plates, and that he preferred to use an osteoperiosteal flap from the tibia in suitable cases.

Lambotte ¹¹⁹³_{Feb., '05} describes a successful case in which he used aluminium to repair a cranial defect, the wound uniting by first intention. The parts are pliable and the patient experiences no pain, while nothing abnormal can be detected by palpation, the skull being as regular in shape and as resistant on the one side as on the other. The author regards the method as evidently superior to re-implantation of the discs removed by the trephine (Walther), living bone-grafts (Seydel), or decalcified bone.

The advantages of Wagner's method of temporary osteoplastic resection of the skull are well known. Carl Beck, of Chicago, ⁶¹_{Dec. 15, '04} from the difficulty experienced in its use in several instances, has been led to modify it in certain details. When the bones of the skull are divided vertically,—in operating by the methods of Wagner, Chipault, Toison, or Bruns,—a rather wide piece of bone may be removed; and when this piece is put back

in place afterward, its defective apposition or strong cerebral pulsations may cause it to be lifted up entire. Beck obviates this danger by dividing the bone obliquely instead of vertically. He makes a flap with a wide base,—rectangular in form,—the periosteal flap being, if necessary, narrower than the cutaneous one. He then cuts with a chisel into the bony wall in three directions as far as the diploë, as in the Müller-Koenig plastic operation, thus obtaining a bony flap with a much larger surface of diploë, which may, indeed, be made of any extent desired. In order to divide the flap as far as the dura mater he uses a rongeur forceps and afterward Lannelongue's microcephalus forceps or Chipault's scissors, with which he easily and rapidly divides the thin diploic layer.

Poirier, of Paris ²⁴_{Nov. 10, '95} describes an instrument for detaching the dura mater in cerebral operations. The blade is at an angle of forty-five degrees to the handle and may be readily introduced into the opening made by the trephine, separating the dura mater about this orifice. The instrument being of metal, it is entirely aseptic and is useful in cases in which there is reason to suspect an abscess.



NEW DURA-MATER SEPARATOR. (POIRIER.)

Journal de Médecine de Paris.

Charles B. Parker, of Cleveland, ¹_{Dec. 8, '94} values the chisel more highly than the trephine in many cases of depression, for with it there is possibility of saving bone that might otherwise have to be sacrificed. Of course, the chisel should be held obliquely and the mallet used gently, so as not to produce further commotion of the brain. For the past three years John B. Hamilton, of Chicago, has used ⁶¹_{Dec. 22, '94} the "corner" chisel and mallet. He thinks favorably of the circular saw propelled by the dental engine, but has not used it. Before becoming acquainted with the merits of the temporary resections he used the large conical trephine, preserved the bone button with great care during the operation, keeping it in a warm towel previously wrung out of a hot antiseptic solution, and replaced it afterward; but now, with the method introduced by Wagner, he no longer fears non-union of the bony flap when replaced. Here, as elsewhere, the most rigid asepsis must be maintained during the operation and at the subsequent dressings.

Dana, of New York, ⁹⁹_{Oct. 10, '96} does not approve of the use of the chisel in infants and children, the perfected electrical saw being preferable. Powell, of New York, had operated with the latter

in twenty-seven cases of idiocy and epilepsy, with only two deaths,—a lower mortality than that reported by any other surgeon.

Hammond, of New York, stated that Powell had operated with his electrical saw on seven cases—six infants and one adult—for him. The infants varied from 1 to 7 years and the adult was 22 years. The whole operation required not over twelve minutes. He did not think, however, that it would be adapted to other than the straight-line incision. Collins, of New York, called attention to the fact that in operating with the chisel the pulse would sometimes go as low as 20 beats, following several blows in rapid succession. In one instance the patient's condition became such that artificial respiration was resorted to and ether substituted for chloroform. Dereum, of Philadelphia, had also observed slowing of the pulse from the use of the chisel, which he attributed to inhibition from irritation of the dura. Fisher, of New York, said that while there might be some disturbance of the circulation from the use of the chisel, the after-effects did not indicate much cerebral shock or concussion.

Injuries in General.

Bullard ⁹⁹_{Jan. 24, '95} asserts that the primary condition for immediate operation in severe head injuries is increased intra-cranial pressure, which he claims is present in all conditions of lasting unconsciousness, stupor, and coma. For pressure is not always due to hæmorrhage, but in many instances is the result of a swelling of the brain analogous to the so-called acute cerebral œdema. When, therefore, the patient is in a condition of deep stupor and cannot be roused by supra-orbital pressure, especially when the pupils do not react to light, an operation is imperative. When, however, unconsciousness is deep, but the patient can still be roused, the indication is less definite. Much depends on the presence or absence of a tendency to an increase of unconsciousness. In any doubtful case the most careful watch should be kept for any increase in the degree of unconsciousness, and as soon as this has been clearly determined an operation should be performed. The surgeon should act also in all cases in which, whether the patient be only lightly or deeply unconscious, there has been a rapid increase in the degree of unconsciousness or a distinct increase of paralysis of the extremities within the course of a few minutes or hours after the injury. Delirium without unconsciousness, the author holds, contra-indicates operation or indicates that the surgeon should not operate at once. Localized cerebral irritation, as evidenced by clonic convulsions, either general or local, is not a common sign of head injury. In cases in which there is no history,

convulsions render it probable that the case is non-traumatic or that some ordinarily non-traumatic condition has been set up by the injury. In cases in which there is no evidence of paralysis and no pupillary symptoms are presented, the surgeon must consider the general condition of the patient. When operative procedures are resorted to, the author recommends a large opening—at least two inches by one—in the skull and incision of the dura mater. There is no more danger, he holds, in opening this membrane under proper antiseptic precautions than in opening any other serous cavity. The operation should be performed as rapidly as possible. In children many deaths are caused in operations of this kind by loss of time. In adults the consequences are not, as a rule, so serious; still, next to asepsis, time is probably the most important factor in the success of an exploratory cranial operation. Bradford, in discussing the paper, agreed with Bullard that the dura mater should be treated as one would treat the peritoneum,—hesitating to open it when it is not necessary and not hesitating when it is. Post had noticed that many men who meet such compound fractures but seldom are a little surprised to notice that the trephine is not always necessary. A little judgment, a little care, a little use of the rongeur forceps in nipping off projecting points, or the elevator forceps, allows one to lift the depressed portion very rapidly without spending time with the trephine, in a very large proportion of cases. Elliot saw no advantage in opening the dura unless there was fluid under it. After it is opened the brain will be seen at a second operation to be glued to the dura and the dura to the skin, making a scar and a thickened mass involving brain-tissue. Such a condition is objectionable and should be avoided unless absolutely necessary,—an opinion indorsed by Walton. Elliot often opened the skull as an exploratory measure, without feeling that any damage was done; but when the dura is in question he always considered carefully whether it was best to go farther. If fluid were present under the dura there was a sensation of ballottement, of fluctuation. The dura did not necessarily bulge when there was blood under it. As regards the time of the operation, Elliot had usually felt that there was no hurry, and was governed entirely by the pulse and condition of the patient. The packing of the cavity was a matter requiring great care and attention, and he questioned whether it should be left for ten days in the wound.

[Prince called attention to the fact that many of these cases afterward turn up in the neurological departments of the hospitals, and their condition is pitiable. It seems to him that the after-condition of the patient should be considered in a doubtful case,

where there is uncertainty as to the location of the hæmorrhage if one be present, and operation be performed if there is a certainty of not doing harm.]

B. B. Davis, of Omaha, ¹⁰⁶_{May, '95} gives the following indications for operation in head injuries: 1. If dullness of the intellect or loss of consciousness slowly develop there is pressure due to a slow hæmorrhage, an abscess, a cerebritis, or a meningitis with effusion, and there should be no hesitation in making an exploration with the trephine. 2. If paralysis or even paresis of the tongue, face, arm, or leg supervene, the most rational procedure is to trephine, choosing the site by the localizing symptoms, but not entirely disregarding the position of the blow. 3. Twitching of muscles should not be regarded lightly. When such symptoms supervene even in the slightest degree, it gives a strong suggestion of future epilepsy, and an exploratory trephining should not be long delayed. 4. Perversions of sensation, an anæsthesia or hyperæsthesia, sensations of heat or cold, over definite areas, require careful consideration. If not due to constipation or some error of diet, the use of the trephine is not only justified, but failure to use it is reprehensible. 5. A chill is usually indicative of pus formation, and should put the attendant upon his guard. Pressure symptoms will probably soon appear. 6. Continuous fever speaks for the presence of some form of inflammation,—cerebritis, meningitis, or a localized abscess; and the use of the trephine ought not to be long delayed. 7. Finally, and most important of all, because the symptom is oftenest present and least often taken into account, prolonged tenderness upon pressure over the site of the injury is an almost invariable symptom of a fracture of the inner table of the skull and an irritation of the dura at that point. The skull being somewhat elastic, pressure causes the sharp fragments to impinge upon the sensitive dura.

Fractures.

René le Fort, ¹⁰⁰_{Nov. 27, '94} points out a new sign of certain severe fractures of the base of the skull,—viz., crossed otorrhagia. He describes three cases in which fracture of the vault produced a complete fracture of the petrous bone on the opposite side of the base. In the first the fracture of the vault was in the temporal region, in the second in the fronto-temporal, and in the third in the occipital. In the first case the line of fracture, irradiating from the temporal region, reached the sphenoidal fissure (Fig. 1) by two ways,—both anteriorly and in the middle line,—traversed the sella turcica, and reached the petrous bone on the opposite side; and, the violence of the traumatism not yet being exhausted,

a separation of the petrous bone and the great wing of the sphenoid followed, the fracture thus traversing the entire base of the skull. At this point the course of the fissure naturally followed the easiest route, and the one deviating least from the original direction by offering the least resistance; it traversed the petrous bone through the particularly fragile portion hollowed out by the tympanum, the membrane of which, being ruptured, caused abundant and persistent hæmorrhage from the ear on the opposite side from the fracture of the vault.

The second case was analogous, the frontal eminence being the seat of an irradiating fracture, the left temporal being fract-

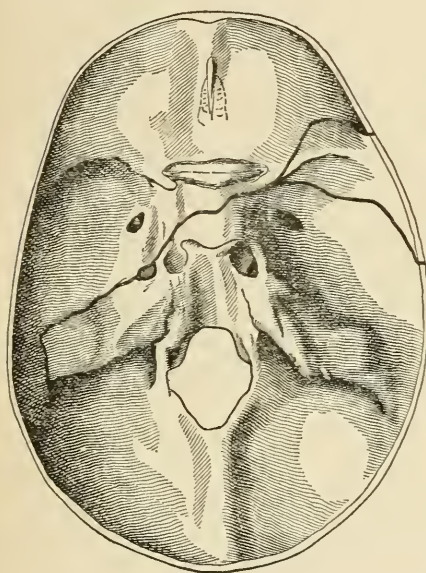


FIG. 1.

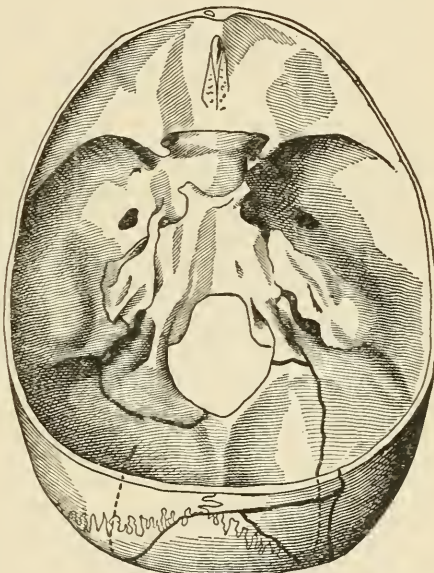


FIG. 2

FRACTURE OF BASE OF SKULL. (RENÉ LE FORT.)

Gazette des Hôpitaux.

ured and the ethmoid and anterior portion of the skull fractured by transmission through the bones of the nose. These multiple fractures sent out fissures toward the sphenoid and the sella turcica was broken; and, as in the preceding case, and for the same reasons, the fissure, on reaching the vault, was directed backward, fracturing the petrous bone at the level of the middle, impinging somewhat on the internal ear. In this case, also, there was otorrhagia on the opposite side from the lesion of the vault; and, guided by the first case, the author was able to make an exact diagnosis of the cause of the crossed otorrhagia before autopsy. The importance of this sign, as regards the prognosis, is evident,

since its production implies extensive violence and traumatism. As in all cases of otorrhagia, however, it must be ascertained whether the source of hæmorrhage is not some external and common one, or whether it is accompanied by all the signs of fracture of the petrous bone.

The author remarks that, though complete fracture of this bone may thus result by propagation of a fracture from the frontal and parietal regions of the vault on the opposite side and cause aural hæmorrhage by the mechanism explained, the same does not necessarily occur when the fracture of the petrous bone is due to a fracture of the occipital region on the opposite side. His third case illustrates this point. (See Fig. 2.) Here the line of fracture was distinctly transverse, passed within the internal ear, at a level with or a little behind the auditory foramen; it might have passed still farther in (but, also, still farther out), and it was not forced to separate the petrous bone, so to speak, at its insertion into the vault, as it would had it followed the bone longitudinally and reached the vault, from which it could not ascend.

Le Fort believes that crossed otorrhagia will be especially met with in fractures of the base consecutive to fractures of the frontal or temporal regions of the vault, and that in these cases it will constitute an important sign, both in diagnosis and prognosis.

The differential diagnosis of intra-cranial injuries is discussed at length by Charles Phelps, of New York, ¹_{Dec. 15, '94} and B. G. Gudden, of Oshkosh. ²⁰²_{Aug. 26, '95}

In a case seen by Savariaud, of Paris, ⁷_{No. 23, '94} death seemed to have been due to diffuse hæmorrhage from rupture of the internal carotid, extending to the bulb and involving the ventricles.

Alfonso Ortiz, of Mexico, ¹⁷⁹_{June 1, '96} observed a case of fracture of the cranium complicated with delayed traumatic epilepsy and impulsive insanity.

Shepherd, of Montreal, ²⁸²_{Dec., '94} reported a case of fracture of the skull with a pulsating tumor, in a girl of 9 years. There was a hole over the orbit through which the membranes could be felt pulsating, while the line of fracture could be made out with the finger. Eight days after admission to hospital she appeared to be improving.

J. Wherry Wilson, of London, ²_{June 1, '96} gives details of the conditions observed in a case of fracture of the skull thirty years after injury. The patient was a man, 60 years old, of somewhat feeble intellect and addicted to drink. He had received an injury to the head from the bursting of a shell during the Chinese war of 1860. He died from an attack of bronchitis, to which he was subject. The whole frontal region from the supra-orbital eminences to the

coronal suture appeared to have sustained a severe compound fracture,—or series of fractures, for it must have been completely smashed in,—and presented, thirty years after the occurrence, a concave, uneven surface. Bony union was complete, and irregularities, probably corresponding with the lines of fracture, could be distinctly felt through the skin. Passing laterally across the concavity, about one inch above the supra-orbital eminence, was a bridge of bone, two and one-half inches in length by one-third inch in depth, entirely invested by skin and leaving an opening beneath it through which a No. 12 catheter could be passed.

Tubby ²_{Apr. 13, '96} operated successfully in a case of punctured fracture of the skull in which symptoms of compression had persisted for thirty-four days. The peculiar features of the case are: the serious nature of the injury, although attended with such apparently slight symptoms; the depth to which the fragment of bone had been driven, and the rapid relief afforded by its removal. The circulation in the superior longitudinal sinus must have been interfered with, but no ill effects seem to have followed.

Seydel ³⁴_{Sept. 28, '94} operated on a man who had fallen from a fourth story, striking on his head, but who had not lost consciousness. There was a depression one to three centimetres wide in the left parietal bone and two tears in the longitudinal sinus. Marked anæsthesia and motor paralysis existed on the right side. Splinters of bone were removed from the wound and the bleeding arrested by iodoform gauze. On the third day the brain bulged into the opening, the anæsthesia disappeared, and there was some recovery of power. A plastic operation was then performed to prevent hernia cerebri, and seven months after the accident the patient had almost entirely recovered. A similar plastic operation for hernia cerebri was performed by A. C. Bernays, of St. Louis. ⁵⁹_{Mar. 30, '96}

Dasara ²⁵⁰_{p. 35, '95} describes the case of a patient who, after a fall from a horse, presented all the signs of fracture of the skull,—coma, otorrhagia, and subacute delirium,—cerebral contusion, rather than compression, being evidently present. This state lasted for eight days and was followed by epileptiform convulsions, becoming more and more frequent until they recurred at intervals of two minutes. The temperature reaching 39.6° C. (103.2° F.), Roth performed exploratory craniectomy, but found no abnormal condition either of the brain or meninges. The attacks having disappeared as soon as the skull was opened, it was decided to go no farther, and the operation wound was closed. The results were unexpected, fever and attacks disappearing and perfect lucidity returning within twelve days. Roth believes that the evolution of the contusion was arrested by the craniectomy.

A successful trephining for injury to the head was performed at sea by J. Tertius Clarke, ⁶_{Sept. 23, '95} under un auspicious circumstances as regards asepsis.

The tolerance of very young children to severe wounds is illustrated by a case recorded by C. H. Mastin, of Mobile, ⁹_{July 13, '96} that of compound fracture of the skull, with severe laceration of the brain, in an infant 2 months old, in which recovery followed appropriate treatment.

John E. Link, of Terre Haute, Ind., ³⁶⁴_{Oct. 1, '96} relates a number of instructive cases, including one of pistol-shot in the head in which the bullet passed entirely through the brain, yet produced no symptoms after the mere application of gauze, although there was hernia cerebri due to mechanical collapse with stasis and blood-clot formation. A second case showed great loss of brain-tissue without any evidence of loss of function of the frontal region. In another case there seemed to be only a slight injury, the patient being simply comatose for a little time, afterward becoming aphasic. There was no evidence of fracture except bleeding from the vault of the pharynx. Upon trephining over the third frontal convolution (on account of the aphasia) a subcortical clot and a considerable amount of serum were liberated, but no improvement resulted. Meningitis developed and the patient died. Examination showed fracture of the base extending into a wound of the pharynx, through which infection came. Another patient was shot through the face, making such a huge hole that a whole handkerchief was passed through it, and a newspaper could be read through the hole in the man's head. Yet the wound healed, leaving only a trifling amount of a scar on either side instead of a horrible deformity as expected, thus exhibiting the wonderful restorative power of the head.

Two cases of compound depressed fracture of the skull are described by A. H. Wilson, of Liverpool, ¹⁸⁷_{July, '95} and are interesting from the fact that, after all apparent cause of pressure or irritation had been removed, blindness persisted in one patient and aphasia in the other. Both eventually recovered, however, and this fact causes the author to suggest that, in cases where symptoms are not increasing, the operation of incising the dura be deferred until nature has had a fair chance to effect absorption,—say, for at least a fortnight.

J. Philippe Tamiesie, of Hillsboro, Ore., ⁸²⁰_{June, '95} trephined successfully in a case of fracture of the skull, some convergence of the left eye remaining, which the author attributed to injury of the brain-substance. F. S. Watson, of Boston, ⁹⁹_{Jan. 24, '95} operated successfully on a fracture of the base involving the cavernous sinus,

and C. B. Dale, of Aylesbury, ⁶_{Mar., '95} on a fracture of the base with outward displacement of the bone.

A fatal case of fracture of the base of the skull was observed by J. W. Stenhouse, of Leith, ⁶_{Oct. 20, '95} in which rupture of the right internal carotid had occurred,—a rare condition.

Fractures of the orbital wall and margin are discussed by H. McL. Morton, of Minneapolis. ¹⁰⁵_{Nov., '94}

A case of trephining in head injury with paralysis of opposite arm, followed by fungus cerebri, is recorded by R. M. Harbin, of Calhoun, Ga. ¹⁹_{Nov. 24, '94}; and successful cases are also published by D. C. Ramsey, of Mt. Vernon, Ind. ⁵⁹_{July 27, '95}; J. B. Murfree, of Murfreesboro, Tenn. ¹⁹_{Nov. 17, '94}; P. Ruotte ¹⁰⁴³_{Sept. 1, '95}; J. S. Triplett, of Harrisonville, Mo. ⁹_{Nov. 10, '94}; Crickx, ¹¹⁹³_{Mar. 15, '95}; Russel and Pinkerton ²_{June 15, '95}; W. K. Beatty ⁵⁹_{Oct. 5, '95}; Boulengier ¹¹⁹⁵_{Nov. 3, 4, '95}; J. B. Crandall, of Sterling, Ill. ¹⁹_{Oct. 20, '94}

John Ashhurst, Jr., of Philadelphia, ¹¹⁰_{June 29, '95} states that, of 41 cases in which he trephined the cranium, 20 ended in recovery and 21 in death, showing a mortality of little more than 50 per cent. In many instances he has refrained from interference when other surgeons would have operated; so that his cases have been of an unfavorable type and the mortality has no doubt been higher than if he had operated more indiscriminately.

Twenty-four of his cases were primary operations for compound fracture, with 11 recoveries and 13 deaths; 2 were operations during the intermediate period, both successful; and 3 were secondary operations, with 1 recovery and 2 deaths, both in cases of abscess. As far as it goes, this analysis confirms what has so often been pointed out,—that there is not so much urgency in operating upon compound fractures of the skull as there is in compound fractures of the extremities. In the latter, the sooner the operation is done, if the patient is able to bear it, the better.

As regards the locality of the injury, he finds that of fractures involving the frontal bone—omitting those simply involving the frontal sinuses—there were 5, with 4 recoveries and 1 death. These figures do not confirm the general impression that there is special danger in fractures of the frontal bone. Indeed, much more depends upon the amount of injury to the brain than upon the place of the fracture. In one case the indication for trephining was bleeding from the middle meningeal artery, and in that case the patient recovered. He was an athlete, who, while playing foot-ball, came into violent collision with another player, sustaining a fissured fracture of the parietal bone. He was stunned at the time, but soon recovered consciousness; in the course of half an hour, however, convulsions came on, followed by coma. He was brought to the hospital, and Ashhurst applied the tre-

phine, evacuating a considerable quantity of clot; the patient made an uninterrupted recovery.

In the discussion T. G. Morton asked Ashhurst whether in cases where there was a marked depressed fracture of the skull he would prefer to leave it and wait for developments, or whether he would think it best to proceed at once. To which question Ashhurst replied that he would not push the argument from statistics, and that in cases in which the operation was clearly indicated he would operate at once; but that where there was a doubt in the mind of the surgeon as to whether he should operate or not, a short delay would not be so injurious as it would be in the case of amputation. In cases of impacted fracture his practice had been, as a rule, not to interfere in the absence of symptoms. In cases in which there is no opening into the cranial cavity and no cerebral symptom, he believed that the surgeon is justified in waiting for more definite indications. At the same time he was more inclined to operate than he was twenty years ago, on account of the greater safety afforded by modern methods of wound treatment.

Jas. Bell, of Montreal, ²⁸²_{Sept., '95} is of the opinion that brain injuries have not always been treated with sufficient promptitude in the past. He has seen a number of cases die from hæmorrhage where early operation would have saved the patient's life. It is better to open the skull unnecessarily a dozen times rather than let one patient die for the want of operation. Generally speaking, the dangers from head injuries are direct dangers from hæmorrhage—not from the loss of blood, but the pressure of the clot upon the brain within the unyielding cranial cavity—and the driving in of spicules of bone.

In a discussion following the report of a case of fracture of the skull successfully operated on by McDonald, ¹⁴⁷_{June, '95} Shields indorses the correctness of the stand taken by the California Academy of Medicine, that it was wise to operate immediately even in simple fractures of the skull. By trephining we do away with the liability of the depression of the inner table, causing injury to the meninges and brain itself.

Abscess.

[The *Lancet*, in an excellent editorial, comments on an address delivered by Augusto Murri before the Medical Association of Lombardy, ⁶_{Jan 5, 12, '95}; ⁶_{Feb. 2, '95} dealing with the question of early operation in cerebral abscess. Murri points out that, while in many cases an acute abscess of the brain may be diagnosed with some certainty, a chronic cerebral abscess may exist and yet give no positive indication of its presence. Too often the condition is only

discovered by post-mortem examination. The diagnostic indications of a chronic abscess of the brain are few and untrustworthy. Of first importance among such indications is the presence of a sufficient cause, such as middle-ear disease, local injury, or caries of the cranial bones. Not that the exciting cause need be so grave as these; the abscess may follow any of the specific fevers, and as these occur so very frequently without leaving any such sequela the connection may not be recognized. The signs of a chronic cerebral abscess are few in number,—pyrexia, headache, and optic neuritis,—but none of these can be depended on; pyrexia is often completely absent, and, as Murri points out, in many cases a sub-normal temperature is present; the headache, if localized and persistent, and occurring after one of the usual exciting causes, is suggestive, but nothing more; and optic neuritis may equally be a sign of a tumor or meningitis. Other symptoms, such as paralyses, though often of use in determining the situation of a lesion, are of no value in deciding as to its nature. If we have in any case a sufficient cause, and the signs already mentioned are well marked, we may be fairly confident that an abscess is present, but we cannot be at all certain. Several of the extremely interesting cases with which Murri has illustrated his paper demonstrate this most definitely; all the usual indications of a chronic cerebral abscess were present, and yet at the necropsy some other lesion was found. Yet the disease is most dangerous to life, and if timely surgical aid is not afforded death must result. Under these circumstances what should be done? Shall we wait until symptoms arise which will definitely satisfy us that an abscess is present? If so, it will in a large majority of cases be too late to operate; the abscess will have extended and have ruptured either on to the surface of the brain or into one of the ventricles. The surgeon is on the horns of a dilemma; if he operate before he is certain of the presence of an abscess he may find some other lesions for which he can do nothing; and if, on the other hand, he wait until he is sure of his diagnosis the delay may prove fatal to the patient. The decision must depend on the amount of danger connected with the operation itself. A very similar case is to be found in many abdominal conditions where, an exact diagnosis being impossible and the danger to the patient great, it is now customary to perform an exploratory laparotomy. If, then, exploratory trephining is in itself as little dangerous as exploratory laparotomy, it is obviously the duty of the surgeon, notwithstanding the weakness of the diagnosis, to attempt to discover and cure the morbid condition by opening the skull. With complete antiseptic precautions the operation itself, if carefully performed, is practically free from

risk, and it is seldom, indeed, that it is followed by any disastrous effects.

It is a plea for greater frequency in this operative proceeding that forms the text of Murri's admirable contribution. The tendency at the present time among Continental surgeons is to await a certain diagnosis, with an eminently unsatisfactory result, for the statistics show that waiting for more data means waiting for more deaths, as by the time the diagnosis is certain the patient is dying.]

Von Bergmann, of Berlin, ⁵⁷_{June 23, '96} expresses the opinion that cerebral abscess should always be operated on, the diagnosis being easy when the etiology is carefully considered. Inflammation of the middle ear is in nearly all cases the factor, the abscess being usually situated in the temporal lobe; and here the operation should always begin with the tegmen tympani, as well as in the case of suppurative thrombosis of the sinus. An exploratory puncture should first be made, and, if pus be found, the opening should be enlarged, the pus removed, and the cavity filled with iodoform gauze. In cases of increased cerebral pressure von Bergmann advises trephining also, in preference to puncture, the effects of which are only temporary.

Glück, of Berlin, ²²_{p. 256, '96} states that there are some abscesses of the temporal lobe for which chiseling of the mastoid process is sufficient, but other cases require a more extensive operation, which can be performed with safety. In two cases he removed the auditory canal, both bony and cartilaginous parts, freed it from clots, laid open the dura mater, opened the sinus, and ligatured the jugular vein. The facial nerve was, of course, injured, but the resulting paralysis passed off completely under electrical treatment.

In the discussion of intra-cranial abscess and its treatment Picqué described to the Paris Surgical Society ¹⁴_{Dec. 23, '94} ²²_{Jan. 2, '95} a case illustrating the value of active intervention in cases of otitic origin. A soldier, suffering from suppuration of the middle ear on the left side, was suddenly seized with intense pain in the parietal region, followed by aphasia and facial paralysis. An operation was decided on. A vertical incision was made behind the ear and the sinus opened and carefully cleaned out with the curette; another incision was made in front, exposing the wing of the temporal bone, which was attacked with gouge and mallet. When the dura mater was reached it was opened and a large quantity of pus flowed out. All the symptoms of compression disappeared as a consequence, except the facial paralysis, which lasted for some time. Two days after the operation an encephalocoele appeared,

about the size of a small orange; the hernia yielded to ligature and the aperture was successfully covered by a flap taken from the lips of the wound. The man made an excellent recovery. Rou-tier said that he had operated on a woman, 26 years old, who had suffered from suppurating otitis from the age of 12. Intense pain was felt a few days before her admission into hospital. The speaker trephined the mastoid, and by this means a large amount of matter was drawn out. The results of the operation were at first excellent, but on the fourth day the fever ran very high; there was no other symptom. The fever increasing and the patient sinking into a semi-comatose state, another collection of pus was suspected, and the trephine was applied over the auditory canal. Although the dura mater was incised no pus was found. However, on the third day afterward the temperature fell and a quantity of matter was found on the dressing, indicating that another infected region had escaped the notice of the operator. The patient got well rapidly.

Schwartz expressed the opinion that it is frequently difficult to locate exactly the seat of the abscess. In July last, for instance, he trephined the mastoid apophysis for lesions consecutive to otitis, and in spite of this intervention the temperature continued to rise. The patient died, and at the autopsy suppurative myelitis was discovered.

At a meeting of the Medical Society of Victoria, Moore ²⁸⁵_{Feb. 20, '95} described the case of a girl, aged 9, in whom a temporo-sphenoidal abscess, following middle-ear disease, was successfully treated by drainage.

Monnier, of Paris, ¹¹⁵³_{Nov. 6, '95} states that it was formerly admitted that the development of an otitic abscess necessarily implied a pre-existing chronic suppuration of the ear. To-day, however, it is known, from cases observed during the recent epidemics of influenza, that cerebral abscess may develop after an acute suppuration of the ear.

H. Eulenstein ³⁸⁵_{No. 3, '95} has collected eighteen such cases, and adds one of his own in which the patient had had no discharge from the ear, the only sign of disease of the mastoid process being dullness on percussion. The cerebral abscess had caused neither somnolence nor fever, but there was a lowered internal temperature and a diminution of hearing on the opposite side from the abscess. On the eighth day incessant hiccough supervened. It was seen on trephining that even very slight packing of the cerebral wound produced the same effect as the compression caused by the pus. The patient completely recovered.

Broca, ²²_{Jan. 9, '95} finds, from a study of statistics, that, out of eighty-

seven cases of trephining for otitis, only in one was a cerebral abscess present. As to the treatment of intercranial pus of otitic origin, it is good surgery to trephine the mastoid process and to wait and see if the symptoms persist, as it not infrequently happens that, under the influence of local and medical treatment, the patient gets well.

Secker Walker, of Leeds, ²_{Nov.17,'94} gives notes of a case of double mastoid abscess with septic thrombosis of the left lateral sinus. The patient, a woman aged 34, had had double otorrhœa for four years. Abscesses appeared on each parietal bone a month previous to admission to hospital, but the mastoid region on each side seemed healthy. For a fortnight there had been constant vomiting and headache and rigors every night. Temperature when seen, 103° F. (39.5° C.); pulse, 130. The left mastoid cells were opened and the contents cleared out, the lateral sinus laid bare and found to contain pus and breaking-down clot; this was scraped away until free hæmorrhage from the upper end of the sinus took place. This was plugged with antiseptic wax. The right mastoid was opened and pus and *débris* removed. Recovery was uneventful.

A case of two abscesses of the brain caused by septic emboli, resulting from gunshot wound of the lung inflicted thirty-two years previously, is recorded by Eskridge and Parkhill. ¹_{Aug.10,'95}

In reporting two successful cases of trephining after traumatic brain affection Nasse, of Berlin, ⁴_{Jan.21,'95} distinguishes between late and early cerebral abscess. The late abscess apparently does not arise in the contused part itself, but in a healthy one, just like non-traumatic abscesses after traumatic suppuration in the bones and soft parts. These late abscesses generally lie deep, and are covered by normal cerebral cortex. The early abscesses usually arise in the injured area, into which infective material penetrates from without. Fatal meningitis is often associated with immediate suppuration. If the suppurative process is slower, however, and the wound in the brain small, adhesions of the cerebral membranes take place in the region of the injury, and abscesses may result. These abscesses are, to a certain extent, the result of retention of pus in the nests and sacs of a deep wound, are generally superficial and cortical. They do not develop before two weeks. Very early onset of paralysis or symptoms of irritation are rather signs of meningitis, while the late appearance of symptoms points rather to abscess.

Cerebellar Abscess.

Gorham Bacon, of New York, ⁵_{Aug., '95} describes a case of cerebellar abscess resulting from chronic otitis media, and illustrated



Abscess of Cerebellum
due to Suppurative otitis media. (Bacon, Gorham.)

a. Abscess cavity and its wall. b. Area of hemorrhagic softening.

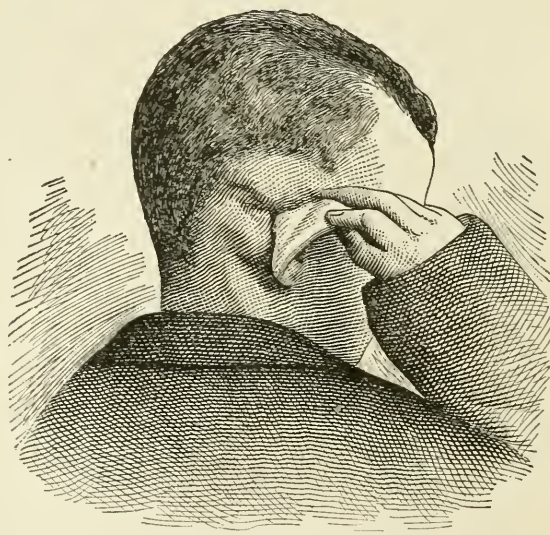
American Journal of the Medical Sciences

by the colored plate shown herewith. The patient, a man aged 31, had suffered from purulent middle-ear disease (right side) for five years. On several occasions granulation-tissue had been removed from the ear and astringent lotions used. Six days before admission to hospital he commenced to have nausea, vomiting, and vertigo. Bone-conduction was found almost absent. The mastoid antrum was opened in the usual way, and free drainage with the middle ear established. Some days after the operation vomiting recommenced, and severe pain upon the top of the head, especially marked upon the left side and radiating to the occiput, was complained of. These symptoms increased in severity, with, in addition, intense vertigo on motion, staggering gait, paralysis of the right side of the face, and a pulse of from 50 to 60 per minute. The pain was more marked upon the left side, and was of a shooting character, extending from the occiput to the frontal area. When the patient sat up in bed and looked to one side there was always a tendency to fall to the opposite side. Upon percussion the note on the two sides of the head appeared to be the same. An abscess in the cerebellum was now diagnosed and immediate operation advised. The right cerebellar lobe was accordingly explored, but no pus was found. The patient died shortly afterward, and at the autopsy the right lateral lobe of the cerebellum was found enlarged, its inferior surface markedly discolored, and its consistence soft and friable. On division of the right cerebellar hemisphere an abscess containing thick, fetid pus was found in its anterior part. The cavity of the abscess was surrounded by a wall three millimetres in thickness. There was no evidence of meningitis on the surface of the cerebellum. The author remarks that, according to Körner, abscesses of the brain secondary to purulent middle-ear disease are found more frequently upon the right side than upon the left. After examination of the brain and abscess-cavity, it appeared to the author that it would have been impossible to have evacuated the pus even with a trocar of large calibre, on account of the thickness of the pus.

From a case of the same kind, also ending fatally, L. Monnier, of Paris, ¹¹⁵³_{Nov. 6, '95} draws the following conclusions: 1. When trephining is followed by real improvement, and then by cerebral symptoms without localizing phenomena in the cerebral hemispheres, pus should be sought for in the cerebellum. 2. The incision should be made behind in such cases, for, while apparently involving the lateral sinus, a fibrinous clot will probably prevent too great hæmorrhage. 3. The incision should also be made downward, as, the patient being in the dorsal decubitus, the cerebellum is placed in such a position as to prevent a free flow of pus.

R. W. Murray, of Liverpool, ²_{Jan. 5, '95} reports three cases of abscess. In one of these, a case of cerebellar abscess due to middle-ear disease, dating back three weeks, the diagnosis was arrived at chiefly on anatomical grounds, the sigmoid groove being diseased, and from the absence of definite symptoms of a lesion of the temporo-sphenoidal lobe a vertical incision over the mastoid process opened on a subperiosteal abscess. During the next few days the general condition was worse, rather than better. The temperature varied from 98° to 100° F. (36.7° to 37.8° C.), the pulse from 80 to 90 and was irregular.

There was swelling and tenderness on the upper part of the



INCISIONS IN A CASE OF CEREBELLAR ABSCESS WITH EXTRA-DURAL ABSCESS
OVER SIGMOID SINUS. (MURRAY.)

British Medical Journal.

neck, corresponding to the line of the internal jugular vein. Frontal headache persisted. He was again placed under chloroform, the mastoid antrum opened and found to be full of offensive granulation-tissue, and on further removing bone to expose the sigmoid sinus he opened an extra-dural abscess on the sinus, about a drachm of thick, non-offensive pus escaping. The sinus, covered with granulation-tissue, was collapsed, appeared to be thrombosed, and was not opened. The boy was not materially relieved by operation; in fact, two days afterward was markedly worse, though the swelling in the neck was rapidly subsiding. He still had constant frontal headache and vomited occasionally. His respirations were sighing, and the pulse varied from 40 to 60 a minute and was

irregular. He had no paralysis of the face or limbs, neither was there any ocular paralysis, and his pupils were equal. There was no aphasia, motor or sensory. The optic neuritis was more marked. The temperature was 97° F. (36.1° C.). An abscess of the right lateral lobe of the cerebellum being suspected, Murray exposed the cerebellum by nibbling away the bone from the seat of the former incision. The dura mater bulged, but did not pulsate. On incising the dura the brain protruded, and by passing a director into the cerebellum in a direction forward and inward he opened an abscess, 4 to 6 drachms (16 to 24 grammes) of sweet pus escaping. The abscess-cavity was well washed out through a drainage-tube, and the tube brought to the surface through an opening made in the middle of the flap, as in the previous case. His pulse, which previous to operation was 20 beats per minute, rose directly after the operation to 100 per minute, and his temperature, which before operation was 97° F. (36.1° C.), rose to 99.6° F. (37.6° C.). Recovery was uninterrupted. In the discussion of Murray's cases ¹⁸⁷_{Jan., '95} Rushton Parker remarked that in opening the skull for cerebral abscess it was evident that the surgeon need not be always anxious about replanting the bone removed, considering that in the three cases the gaps, without replantation, were soundly filled up,—more so than in some cases in which the replantation had been practiced. In order to drain the septic abscesses replantation had been impracticable, but the result was, nevertheless, a sound restoration of the bony case. Hugh E. Jones, in regard to the differential diagnosis between temporo-sphenoidal and cerebellar abscess, said that the error usually made was to mistake the latter for the former. There was rarely any excuse for this mistake; for if the mastoid cells and antrum were thoroughly explored, a clear indication was almost invariably obtained.

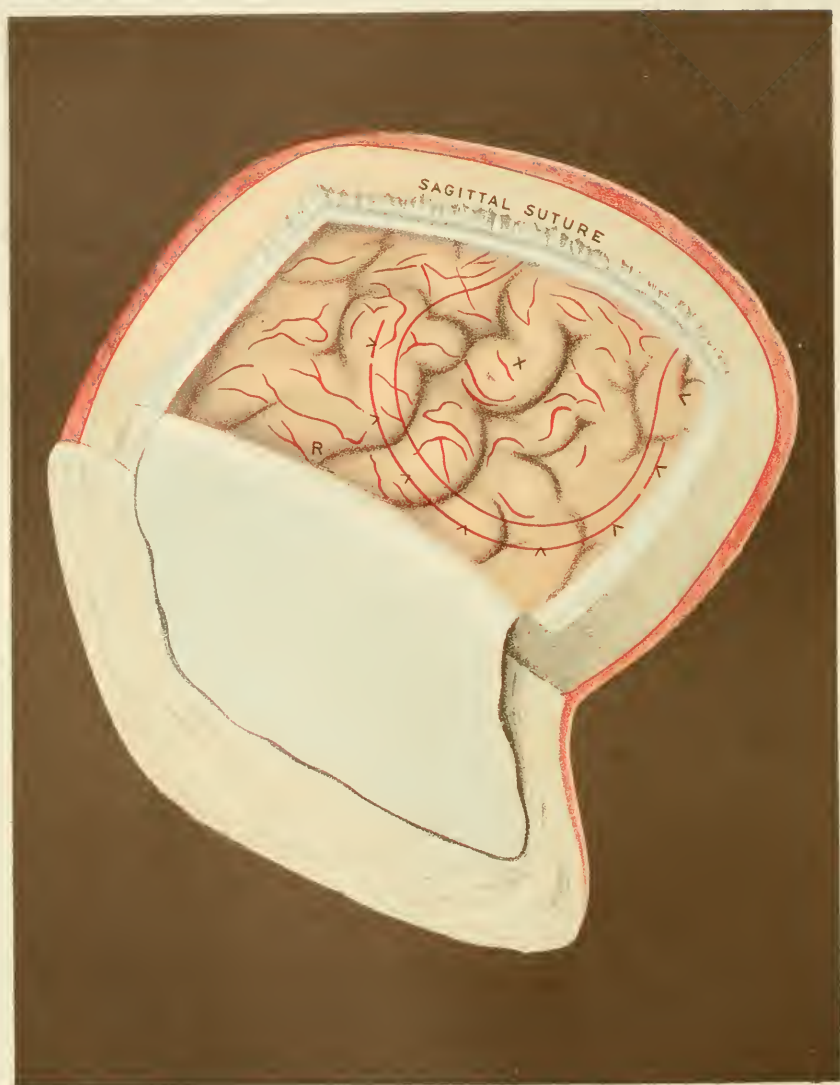
Tumors.

The *Boston Medical and Surgical Journal* comments on the disfavor with which surgeons look upon radical operations for infiltrating growths, owing to the supposed danger of cutting into cerebral tissue. The teaching of localization has impressed the idea more and more that injury to the motor cortex must lead to permanent paralysis, and that, therefore, excision of cortex or underlying white matter should be scrupulously avoided. As a consequence of this perhaps partially-justified timidity, operations are constantly being done with entirely negative results, so far as permanent relief to the patient goes. The skull is trephined, the dura opened, and the brain exposed, the tumor in a large proportion of cases being found. If the new growth be not definitely

marked off from normal brain-tissue,—in other words, if it be of the frequent infiltrating gliomatous type,—the dura is replaced, the skin-flap sewed, and the patient, often with increasing hernia cerebri, left to die, with relief of pressure symptoms, but with no outlook for prolonged life. Such is the usual routine.

Cases are now reported, however, in which bolder measures were undertaken. One of these, under the care of Alfred C. Wood, was operated on by J. William White, of Philadelphia.¹¹² It was a subcortical glioma of the cerebrum, affecting principally the arm-centre, and was accurately located by the clinical signs. The patient was a man, 28 years old, who had first observed twitching of the hand two years prior to operation. On opening the skull with the trephine the tumor was exposed and was removed as completely as possible, after enlarging the trephine opening with the rongeur forceps. The patient recovered from the ether, but there was immediate and complete left-sided paralysis, followed by perfect restoration of the normal condition in the face and the return of a very fair degree of function in the leg, while motion in the arm has failed to improve markedly, showing that the arm-centre had been probably almost entirely removed, while the face- and leg- centres were but slightly encroached upon at the operation, and, although suffering temporarily from the traumatism, had preserved their integrity. After a time the growth recurred and a second operation was performed four months after the first. The patient, although partially paralyzed, was healthy at the time of the report, seven months after the second operation.

The second case, also one of subcortical cerebral tumor, is recorded by Beever and Ballance, of London.² The salient symptoms presented by the patient were as follow: 1. The gradual onset of the paralysis, involving successively the right ankle, the knee, and the hip, extending, after the lapse of seven months, to the joints of the right hand and then to the whole upper extremity, speech also becoming affected. 2. The classical symptoms of intra-cranial pressure,—headache, vomiting, and optic neuritis. 3. Gradual deterioration of the mental condition. 4. Some loss of sensation, affecting the right limbs chiefly, the face escaping entirely. 5. The absence of family history of tubercle or personal history of tubercle or syphilis. 6. Aggravation of the condition under antisiphilitic remedies, taken for over six weeks. A preliminary operation was performed for exploratory purposes and, six days later, the dura was opened over as large a space as possible, the cortex, which bulged out over the left ascending convolution, being mottled, thinned, and easily broken through,



Subcortical Tumor (Chas E. Beevor M.D. and Chas A. Ballance M.S.)

British Medical Journal

exposing the tumor. This was removed with a silver spoon, together with a part of the marginal convolution and quadrate lobe, the falx being clearly exposed. As the line of junction of healthy and diseased tissue was so indeterminate, it is not possible to say that the whole tumor was excised. At the close of the operation the brain presented a large, cup-shaped cavity, nearly two inches deep and the size of half an orange. It is probable, the authors state, that the area removed comprised the upper part of the ascending frontal and parietal convolutions, and anterior part of the parietal lobule and the adjacent portion of the marginal convolution. The patient showed considerable shock from the operation, but the general condition improved. There was motor aphasia and paralysis of the right arm and leg, and in two or three days attacks of clonic spasm involving the right angle of the mouth. After this convalescence was uninterrupted, and four months later the condition was as follows: Speech perfect; no headache; mind perfectly clear; no facial paresis. Right arm improved, some rigidity of joints, various movements impaired, hand-grasp weak. Right leg impaired somewhat in function, but walks without assistance. Sensation normal.

In this case, although it is probable that the entire tumor was not removed, there was complete cessation of symptoms attributable to pressure, improved mental tone, and a diminution in the severity of the paralyses.

The accompanying colored plate, made from memory by Ballance, illustrates the plan of and the parts involved in the operation. The opening in the bone corresponds to the deficiency at present existing in the patient's skull. It is to be remembered that the curve of the head prevents the actual linear dimensions of the deficiency in the skull being reproduced on a flat surface. The drawing is a view at right angles to the mid-point of the exposed cortex, and was made in part from the normal brain and in part by the help of one of Cunningham's casts. At the upper border of the opening in the skull is seen the sagittal suture, at the lower border the scalp-flap and the flap of the dura mater. *R* = the sulcus of Rolando; + = the place where the cortex ruptured during palpation. With regard to the area of so-called "motor cortex" involved in the operation the reader is reminded that the ascending frontal and parietal convolutions are separated from each other for a distance of three and three-fourths inches by the sulcus of Rolando. The fine-silk cortical ligatures which controlled the bleeding within the region of the operation are represented. The continuous line within the silk threads is the line of incision of the cortex. The darker blue tint of the

dura below the sagittal suture marks the course of the superior longitudinal sinus.

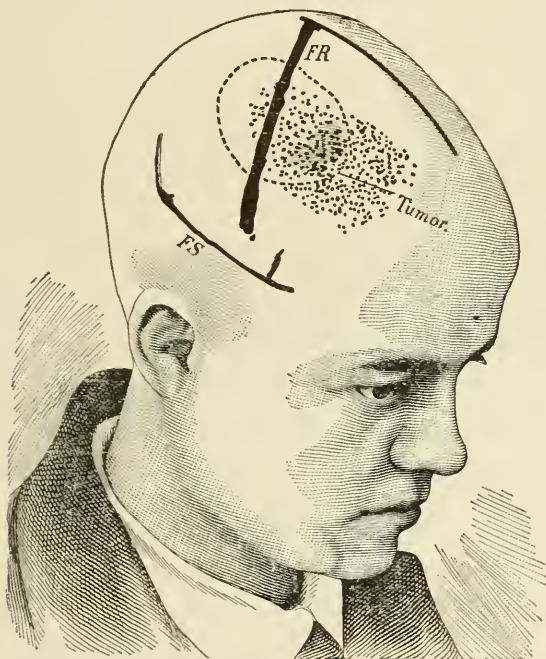
These two cases are examples of exceedingly bold surgery, based on a conscientious effort to eradicate all the diseased tissue, no matter what centres might be included in the process. The results lead to the conclusion that cerebral gliomata and infiltrating tumors generally should be removed surgically and as completely as possible, and that the procedure is not contra-indicated by the localization of the tumors in the motor areas.

Another illustration of the force of these assertions is afforded by the following case, which is a distinct addition to the achievements of cerebral surgery: The patient, under the care of Charles L. Dana, of New York, ¹_{June 22, '95} was a boy of 16 years, suffering from Jacksonian epilepsy, paralysis of the left arm, sensory troubles, headache and optic neuritis,—in fact, the typical general symptoms of brain-tumor,—and also well-marked localized symptoms. From these a diagnosis of a tumor involving the hand- and arm-centres was made; and the fact that syphilis and tuberculosis were absent, as well as the rapid growth, led Dana to believe that a glioma or gliosarcoma was present. The operation was performed by J. R. Conway, the situation of the trephine-opening and of the tumor being shown by the accompanying illustration (from a photograph taken a year after the operation). The dotted line indicates the outline of the trephined area; the dotted area indicates the position of the tumor. Eleven months after operation there was no pain or tenderness in the affected side nor any sensory disturbance in the face or leg. The hand showed defective localizing sense. When a point on the finger was touched the patient, in the majority of cases, referred it to the wrong finger and could not touch a given point on the affected hand with the fingers of the normal hand. The sense of position of the fingers and hand and the tactile, pain, and temperature senses were normal or nearly so. There were no headaches, the eyesight was good, and there were only slight traces of the optic neuritis. The general health is satisfactory. The piece of tumor removed was found to be from a spindle-celled sarcoma. Conway found, by exploration anteriorly, that the growth extended probably some distance beyond the opening in the bone already made; and as the portion already removed was two and a quarter by two inches, and the patient was rapidly growing weak, he thought it advisable to allow any remnant to remain and be removed by a later operation.

A case of cerebral sarcoma successfully relieved by operation is reported by G. R. Murray and W. G. Richardson, ⁶_{Mar. 16, '95} the patient eight months later having recovered good use of the affected

limbs. Four months after operation, in a case described by O. Riegner, ⁵⁹_{No. 23, '94} the ophthalmoscope showed complete atrophy of the right disc; the outlines of the left were hazy and the nerve white, except on the nasal side, which was of a grayish-red color.

Bruzelius and Berg, ³⁷⁰_{V. 66, No. 12} describe a case, in a man aged 58 years, in which a diagnosis was made of diffuse gliomatous degeneration, with cyst formation in the inferior portion of the central, anterior, and posterior gyri of the third and probably of the second frontal convolutions. Berg made a vertical incision four centimetres in length, at a point corresponding to the two inferior thirds



OUTLINE OF TREPHINED AREA. (DANA AND CONWAY.)

New York Medical Journal.

of the central gyri, finding the brain-substance somewhat resistant, hyperæmic, and discolored, the white substance of the cerebrum being bluish. At a depth of one and one-half centimetres a small cyst was met with, the clear fluid of which was evacuated by puncture. A non-operable circumscribed tumor was found to be present, and the wound closed. The patient's condition improved somewhat for awhile, but ended fatally. (Report of Corresponding Editor Eklund, Stockholm.)

M. Richardson, of Boston, ⁹⁹_{July 4, '95} removed a tumor weighing one pound from the left hemisphere in a man of 38 years, who

recovered. The enormous cavity left in the cranium became filled with what seemed to be normal brain-tissue. The aphasia greatly improved, while the power of motion was returning with great rapidity at the time of report.

Bramann, of Halle, ²²⁶_{B.51,H.1}; ²¹³_{Dec., '95} presented at the German Surgical Congress a patient on whom he had operated three years before, and whose case he had reported to the Congress of that date. The tumor weighed 280 grammes (9 ounces) and the opening in the skull measured $5\frac{1}{10}$ by $4\frac{1}{5}$ inches. The patient was, at the time of operation, 29 years of age. The tumor was on the surface of the right hemisphere, and would seem to have involved the dura and inner surface of the skull, making it impossible to close the bony defect.

Symptoms had come on suddenly about a year before, and had consisted of headache and giddiness; double-sided optic neuritis, more pronounced in the right side; paralysis of the left facial nerve; well-marked paresis of the left arm and to a less degree of the left leg; frequent attacks of twitchings and convulsive movements in the paretic regions.

For about three months the patient would seem to have been entirely free. Then came convulsive seizures much as before, with loss of consciousness, passing off and leaving a feeling of dullness and aggravation of the paretic condition. It seemed that these attacks could be explained by accidental compression of the unprotected surface of the brain during sleep; for if the patient were prevented from resting on that side of his head the attacks did not occur; and after he was fitted with an aluminum shield he had a period of five months of complete immunity. The movements of both eyes were free; the left shoulder drooped somewhat; the left elbow, wrist, and fingers were the seat of a progressive contracture; there was a slight enfeeblement of facial muscles on the left side; bilateral optic atrophy, more pronounced in the right fundus, while the reaction of the right pupil to light was also very sluggish.

The patient was quite sensible when presented before the Congress; felt well, apart from occasional seizures; was free from headache and giddiness, and was able to manage his business and superintend his workmen.

O. Kappeler, ³⁰¹_{B.40,II.5,6,'95} from the symptoms present in a man aged 43 years, diagnosed a tumor of the left motor zone, involving the arm- and leg-centres. He resorted to trephining and exposed a tumor occupying the upper part of the fissure of Rolando, the growth having separated the two central convolutions, flattening them out and depressing the fissure. The growth was as large as

a duck's egg. The patient, who had been unable to work, was completely restored by the operation.

Syme, of Australia, ²⁸⁵_{Feb. 20, '95} also reports a case of a tumor of the dura mater pressing on the brain successfully removed by operation.

Wagner ⁴_{No. 7, '95} treated two cases of extra-dural hæmatoma by osteoplastic resection of the skull, with successful results. Gajkiewicz ⁷⁵_{Sept., '95} removed a gummatous tumor from the right hemisphere, involving the arm- and face- centres. The patient recovered.

A case of cerebral tumor in which operation was followed by death fourteen hours later, with symptoms of implication of the medulla, is reported by E. N. Nason, of Nuneaton. ⁶_{May 25, '95}

Walther ¹¹⁵³_{Apr. 6, '95} describes a case of intra- and extra- cranial cyst in the occipital region successfully operated on by Tillaux, and proving that the usual theory of the formation of dermoid cysts is correct. An included part of the ectoderm is caught by the developing cranial bones and, so to speak, strangulated, and in most cases altogether cut off from the surface. Only in this case and in one seen by Lannelongue was any connecting-link left to explain the mode of origin.

Major showed to the Bradford Medico-Chirurgical Society ²_{Mar. 23, '95} a cerebellum containing a large cyst. The patient, aged 11 years, came under his care in September, 1894, and died on October 18, 1894. The symptoms were: headache, vomiting; interference with power of locomotion, going on to inability to walk; failure of sight, and emaciation. On admission there were: double optic neuritis, passing on to atrophy; mental apathy, and a tendency to fall backward on standing; the knee-jerks were diminished on both sides; there was no paralysis. Post-mortem a cyst containing 2 ounces (62 grammes) of clear fluid was found in the left cerebellar hemisphere; there were no signs of hydatid disease.

Graser, of Erlangen, ¹⁴_{Apr. 28, '95} gives the history of a man of 45 years of age, in whom the cerebral symptoms were such as to necessitate operation, a large cyst being found and punctured. Extirpation was impossible. The walls of the cyst were smooth. The patient improved temporarily, but soon another operation became necessary, which proved fatal. At the autopsy a second cyst was found beside the first one, both originating from a malignant neoplasm barely visible to the naked eye.

Eskridge and McNaught ¹_{June 1, '95} describe a case in which a traumatic cyst of the brain developed from an injury received twenty-five years before and caused epilepsy. An operation was followed by recovery. In a discussion before the American Neurological Association the main interest in a case, of which specimens were shown by G. L. Walton, of Boston, ⁹⁹_{Oct. 10, '95} was the

relative value of symptomatic indications. The tumor-surface, two by one and a half inches, occupied the angle between the Rolandic and Sylvian fissures, and extended forward under the healthy cortex beyond the transverse frontal sulcus. It was fairly well defined, but with no distinct capsule. The centre was necrotic. The symptoms suggested so extensive infiltration that operation was considered to offer small hope, but the extension backward was not so great as the hemianopsia would indicate,—a fact which, together with recently published cases of removal of large gliomata, would lead perhaps to a somewhat more hopeful prognosis in another case of this nature. Starr, of New York, mentioned a case in which, on exposing the brain, an extensive infiltrating glioma was found. It had no capsule and was very vascular, the merest touch causing hæmorrhage into the substance of the tumor. The wound was closed. The man died that night from hæmorrhage from the finer vessels through the tumor. That the position of the pain gave no clue to the position of the tumor had been confirmed by every collector of cases since 1880.

The fact that the optic neuritis associated with intra-cranial tumor, as a rule, subsides after trephining was first pointed out by Victor Horsley. J. Taylor^{2048 90}_{7.14; May, '95} reports a number of cases bearing on this subject. Three cases are first recorded in which optic neuritis and other indications of brain-tumor were present, and in each of which the tumor was removed by Horsley. The optic neuritis subsided and the discs became normal. In a second group of three cases, presenting clinically the unequivocal symptoms of intra-cranial growth, all three were trephined, but no tumor was removed. In two of these a tumor was visible at the operation; in the other no tumor was discovered. In two of the cases the neuritis disappeared completely; in a third it underwent marked diminution and was still subsiding when the patient was last seen, though there was evidence that the tumor was growing. Three other cases are reported in which the neuritis subsided after the operation. In one there was optic neuritis in the right eye. A cerebral tumor was removed from the left hemisphere, and the neuritis subsided. The patient died some months afterward and the autopsy showed that there was a cystic condition of the brain at the place from which the tumor had been removed. In another case there was well-marked optic neuritis, with other signs of cerebral tumor. The skull was trephined and a cyst opened and drained. In six weeks the neuritis had disappeared. The drainage was continued for two years, and finally a large tumor was partially removed. The remaining portion increased and death occurred. An autopsy revealed a large tumor of the left cerebral

hemisphere. This was almost a crucial case. The trephining and drainage of the cyst were followed by complete subsidence of the optic neuritis, and at no period during the remaining three years of the patient's life was there any return of the optic neuritis, though the tumor-growth was still present in the brain. In this case, then, trephining and drainage of a cyst in the tumor were sufficient to cause the neuritis to disappear. In another case marked optic neuritis was present: a tumor was removed, the neuritis subsided, and, though the tumor recurred, the neuritis did not. The author refers to two well-known and important facts with reference to optic neuritis: (1) a cerebral tumor of large size may be present without giving rise to optic neuritis; (2) optic neuritis may exist without cerebral tumor. [Taylor's cases show that optic neuritis may disappear entirely after the removal of a cerebral tumor, and also that in certain cases optic neuritis may subside without leaving any trace after trephining has been performed, although the tumor has not been removed. In the latter case Taylor believes that the subsidence of the optic neuritis is due to the relief of the intra-cranial pressure, and that, in certain cases of brain-tumor, the pressure inside the skull is the effective agent in producing what is known as optic neuritis.]

Sänger, ¹¹⁵³_{Feb. 6, '95} basing his opinion on two personal cases, maintains that trephining is warranted even when there is no hope of removing the tumor, since the patient is improved by such intervention; and if it is not practiced he is condemned to blindness, as in a case which he describes in which he believes that optic neuritis and amaurosis could have been arrested by trephining. He regards the operation as justifiable in cases in which, though there are no localizing symptoms, the general symptoms point to cerebral tumor and in which there is a progressive decrease of visual acuity.

Albert ⁸⁴_{No. 1, '95} has practiced palliative trephining in three cases of cerebral tumor occurring in Nothnagel's clinic, applying to cerebral surgery the principle upon which the operations of gastrostomy in neoplasms of the œsophagus and enterostomy in malignant disease of the rectum are based. Paracentesis of the ventricle was not employed, the procedure consisting simply of making extensive openings in the skull, in the first cases without opening the dura.

A case of unrecognized tumor of the centrum ovale in which trephining was done for the relief of intra-cranial pressure is described by Theodore Diller and J. J. Buchanan, of Pittsburgh. ⁵⁹_{Mar. 23, '95}

Jacobi, of New York, ⁹⁹_{Oct. 10, '95} referred to the method of lumbar puncture and removal of cerebro-spinal fluid for the relief of

headache in cases of brain-tumor. The puncture was made between the second and third lumbar vertebræ, and was quite as easy as thoracentesis. About 20 to 40 cubic centimetres (5 to 10 fluidrachms) of cerebro-spinal fluid were withdrawn. While the fluid was flowing the pain increased, but after the removal there was relief for forty-eight to seventy-two hours. The puncture could be repeated at intervals of three or four days.

Cerebral Hæmorrhage.

G. L. Walton, of Boston, ⁵_{Apr., '95} states that one factor in the diagnosis of hæmorrhage not mentioned in text-books is the period of semiconsciousness which, in certain subjects, follows concussion and laceration and gives rise to the suspicion of some more serious gross lesion, as hæmorrhage. This condition is particularly liable to follow severe concussion in the case of young girls, though it also appears in adults, being by no means confined to patients previously disposed to hysteria. It seems rather the effect of profound shock and injury to brain-substance. It may, perhaps, be regarded as allied to the genuine traumatic neuro-psychoses. The patient—say, a young girl—receives a severe blow on the head; a period of true unconsciousness follows. There is no bleeding from the nose or ears, no subconjunctival hæmorrhage, no convulsive motion, nor deviation of the eyes or disturbance of pupils. The breathing is regular and of normal character. Notwithstanding the absence of other untoward symptoms, complete consciousness does not return for a number of days or even weeks. There is apt to be in these cases retention of urine. After a number of days the questions naturally present themselves: Have we not to do with a hæmorrhage? Should not trephining be considered? The absence of all symptoms, excepting the unconsciousness, should lead to the suspicion that we have to do with the mental state rather than with a gross lesion.

Three months is the longest interval on record between the time of receiving the injury alleged to be the cause of the hæmorrhage and the onset of symptoms resulting from hæmorrhage. If general symptoms are present diagnosis of the side of lesion may be made from paralysis of the third nerve alone. In case of bilateral convulsion a dilated and fixed pupil alone may indicate the side of hæmorrhage. Deviation of the eyes and head, though important in corroboration, affords little help as a localizing symptom.

Angel Money, of Melbourne, ¹¹⁸⁷_{May, '95} in considering the surgical treatment of medical cases of profound loss of consciousness, suggests that the time has come when radical measures may be tried

for cases of this kind which are simply permitted to die. Intra-cranial hæmorrhage is regarded as a very natural accident in Bright's disease, atheroma, and hæmorrhagic pachymeningitis. When the hæmorrhage occurs in other situations than the head death need not follow for some months and even years, and if only a few weeks extra of conscious life can be attained by any means such means should be adopted. In the author's opinion, direct operation on the brain is preferable to ligation of the carotid artery. The diagnosis can thus be verified and there is less risk of a fatal issue as the direct result of surgical interference. In-
gravescent apoplexy due to cerebral hæmorrhage may have its essential features simulated by embolism and thrombosis of cerebral vessels. In cases of hæmatoma of the dura mater an exploratory incision through the dura mater might afford temporary relief to the urgent head-symptoms and clear up the nature of the case. Cerebral hæmorrhage into the right hemisphere is an illustration of the class of lesions in which the author thinks craniotomy might be tried. In considering what would have happened had the hæmorrhagic area been exposed and drained, he holds that the patient's condition and chances could have been rendered no worse by any kind of operative interference carried out with the usual precautions of modern surgery.

F. X. Dercum, of Philadelphia, ²⁴²_{Sept., '94} reports the case of a man, aged 50 years, who first experienced slight weakness in the left arm on February 11th, in the morning, and of the left leg the same evening. In spite of treatment the symptoms gradually became more marked until there was complete paralysis of the left arm, decided paralysis of the leg and of the lower half of the left side of the face, but no paralysis of sensation. In-
gravescent cerebral hæmorrhage was diagnosed, and ligation of the right common carotid artery performed the same evening by W. W. Keen, cocaine being used locally in place of a general anæsthetic. The patient bore the operation well. Next morning it was evident that the progress of the paralysis had been stayed, and his condition was much the same as before the operation. On the following day a very decided return of motor power was noticed in the affected limbs, and from this time he steadily continued to improve. When seen two months later there was a very slightly spastic condition of the limbs on the left side and the deep reflexes were somewhat increased, but the patient had a good deal of power on this side. Dercum considers that the symptoms pointed to a progressive capsular hæmorrhage.

The subject of trephining for middle meningeal hæmorrhage without fracture of the skull is considered by W. J. Taylor, of

Philadelphia.⁸⁰
Oct. 15, '94 According to this author, the adhesions between the dura mater and the bone are weakest in the temporal fossa, and for this reason the artery may be ruptured by a force sufficient to detach the dura, yet not so violent as to fracture the bone. Frequently, though not invariably, a period of consciousness follows the insensibility produced by the original violence, and this period of consciousness, which finally lapses into coma, is by far the most important symptom, and is, indeed, worth all the other symptoms combined in forming a correct diagnosis. Paralysis or, rather, hemiplegia may then come on, which gradually extends as the clot increases in size and presses upon the cortical motor centres. If the amount of hæmorrhage be small, only evidences of a cortical irritation in the form of convulsive movements of the arm and leg of one side may be present, and convulsions also may occur.

The pupils may be contracted, due to the concussion of the injury; or dilated, if the clot be large and pressing upon the base of the brain. When one pupil is dilated widely, especially if it be on the same side as the injury, it is of the greatest importance, as showing the pressure of a large clot. The pulse, as a rule, is frequent. Unconsciousness varies with the amount of hæmorrhage; it may be deep coma from the first or the patient may possibly be roused and move the limbs when disturbed. Respiration is slow and stertorous. The temperature rises rapidly to 101° F. (38.3° C.) and even to 104° F. (40° C.).

In a case of injury to the head presenting these symptoms, and especially if there be a period of consciousness between the time of the accident and the onset of deepening coma, it is the duty of the surgeon to trephine the skull and search for the source of hæmorrhage, being guided by the localizing symptoms, and not by the side of the head upon which the injury has been received.

G. L. Walton, of Boston,⁵
Apr., '95 calls attention to the fact that a sinus, as well as an artery, may be ruptured, as in a case seen by him in consultation with Homan and Hildreth, in which fracture of the base, with hæmorrhage, had been the probable diagnosis. He also quotes Pinkham, of Lynn, as having found hæmorrhage from the longitudinal sinus as a cause of death following a blow received in a sparring contest.

Alexis Thomson³⁶
Jan., '95 presented to the Edinburgh Medico-Chirurgical Society two patients who had undergone operation for traumatic middle meningeal hæmorrhage. In the first case the mental dullness and fits of restlessness gradually disappeared and he was up and well one month after the operation; but the

paralysis of the face, tongue, and arm persisted unchanged until forty days afterward, when he moved the arm for the first time. Thereafter he rapidly and completely recovered. The second case was chiefly interesting as showing the success which attends surgical intervention in compound fractures of the skull when infection of the wound can be prevented.

Porter ⁹⁹_{July 4, '96} trephined in a case of ruptured meningeal artery. A fracture with depression was found at the anterior wound, one inch back of the external angular process, with a crack running antero-posteriorly. The patient was delirious and restless for two weeks after the operation, and it was nearly six weeks before his mental functions were sufficiently restored for him to appreciate his situation. He was discharged in two months much improved, and at the time of report had no headaches, but had slight hesitation in speech and was possessed with good physical vigor.

The symptoms and treatment of infective thrombosis of the cerebral sinuses are discussed by George Heaton, of Birmingham, and trephining for traumatic clot by George B. Hopkins, of Brooklyn. ⁵⁹_{Sept. 15, '94}

Fitzwilliam R. A. Evans, of Birmingham, ⁶_{Aug. 31, '96} trephined and drained for basal cerebral hæmorrhage due to violent coughing in a child, death following ten hours after operation.

A case of middle meningeal hæmorrhage, with operation and recovery, is described by C. L. Scudder and F. B. Lund, of Boston, ⁵_{Apr., '96} who give an analysis of forty-five cases of uncomplicated intra-cranial hæmorrhage, collected from French, German, and English medical literature covering the period from 1886 (the date of Jacobson's exhaustive study ⁴²⁸_{V. 43, '86}) to September, 1894. Several cases of intra-cranial hæmorrhage are here recorded for the first time, occurring at the Massachusetts General Hospital, including the case recorded above, which came under the immediate care of one of the writers and was the direct stimulus to the present investigation.

Meningocele.

A. W. Mayo Robson, of Leeds, ⁵_{Sept., '96} states that, although the excision of a meningocele, either connected with the spine or the skull, is considered an operation so heroic as to be unjustifiable, this belief may, with certain reservations, be disregarded. The only really serious difficulty in operating on a cranial meningocele is that occasionally a portion of the nerve-centres may be contained in the sac, but this may usually be diagnosed by careful palpation with or without a preliminary aspiration of the sac. At times this complication may be difficult to determine, as the cerebellar pro-

trusion may be so small and so soft as to be with difficulty felt. This uncertainty need not, however, prevent an exploratory operation, for if, after reflecting a flap of the integuments near the base of the tumor, a small incision just large enough to admit the finger be made into the meningeal sac, this can be effectually closed if it be deemed unwise to proceed farther with the operation. In simple meningocele there is usually a distinct neck to the meningeal sac, which can be ligatured after the integuments have been dissected off; the skin-flaps can then be sutured separately so that the ligatured neck of the sac lies out of the line of the superficial sutures. In the cases in which Robson has operated primary union has been the rule, and recovery from operation has not only

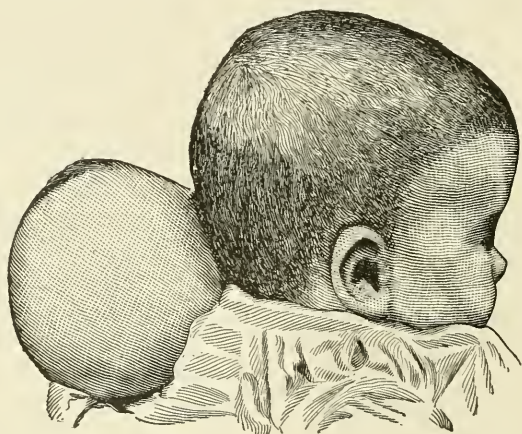


FIG. 1.—MENINGOCELE. (ROBSON.)

American Journal of the Medical Sciences.

been satisfactory, but the after-development of the children has not been impaired. A case furnishing a good example is illustrated by the accompanying drawings. Fig. 1 shows the size of the tumor dealt with; Fig. 2, shape of flap in above case.

A rare case of traumatic meningocele is recorded by Lilienthal⁵ in a child who had fallen from a window and sustained a scalp wound. Three weeks afterward a thick, sausage-shaped swelling was present, which, on being partially reduced, showed a crevice in the bone. By thrusting an hypodermatic needle into the tumor 30 minims (1 gramme) of a clear, non-albuminous fluid were obtained. Three days later the tumor became very tense and vomiting appeared. Aspiration gave issue to 3 drachms (12 grammes) of fluid. An operation was performed three days afterward, a horseshoe incision being made about the tumor. The

fissure in the left parietal bone was about one-fourth inch in width, and began quite abruptly about an inch to the left of the junction of the sagittal and lambdoidal sutures, whence it extended downward and to the left parallel with the margin of the occipital bone and toward the mastoid process of the temporal for two and one-fourth inches. That part of the meningocele-sac covering the edges of the fracture was removed with a sharp spoon. In order to excite new bone formation it was thoroughly scraped from the tissue to the outer table. To protect the subdural space from infection a strip of iodoform gauze was tightly packed into the crevice and brought out at the left lower angle of the wound. The inner aspect of the scalp-flap was now well scraped to free it from the adherent sac and was sutured back into its old place with catgut. After the operation, which lasted for about thirty minutes, there was some general collapse. Next day the boy's condition was good, the highest recorded temperature being 99.2° F. (37.3° C.). The wound was dressed in five days and the gauze pack removed, the flap healing into its old position and recovery following. The reason for the existence of meningocele in this case is not clear. Fracture of the skull is a common accident, while traumatic meningocele is uncommon.

A case of traumatic encephalocele following a gunshot injury is reported by W. B. Lawrence, of Batesville, Ark.,⁵⁰⁶ by whom the protruding mass was successfully removed, the convulsions and paralysis, which had been leading symptoms of the case, completely disappearing. The mental faculties remained slightly impaired. The author alludes to 51 cases occurring during the Civil War,²⁰⁴⁹ 44 of which were fatal; 4 of the survivors, whose history is recorded therein, recovered with full integrity of their mental faculties, while 3 suffered so much from headache and vertigo as to be incapable of much mental exertion.

Tumors of the Cerebellum.

The interest in a fatal case of tumor of the cerebellum, reported by E. D. Fisher, of New York,²⁴² in which operation was performed by John F. Erdmann, lies in the absence of localizing symptoms. The general symptoms left no doubt of the presence of a tumor of the brain,—i.e., the optic neuritis, the convulsions, and the excessive cephalalgia. The situation of the pain

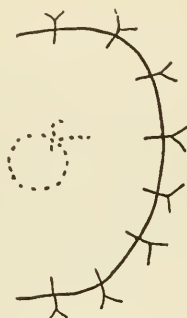


FIG. 2.—SHAPE OF FLAP.
(ROBSON.)

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Medical Sciences.*

was misleading. It had from the very beginning been situated in the right side of the head, with the point of greatest intensity over the orbit. There had, indeed, been some occipital pain, but this was almost lost sight of in the intensity and local tenderness anteriorly. The fact, also, that the loss of sight on the right side preceded that of the left, and the statement that there was loss of smell on the same side, later extending to both sides, led Fisher to believe the tumor to be most probably under the frontal lobe and over the orbital plate, compressing directly the right optic nerve in front of the chiasm. This was confirmed by the absence of any other cranial nerve-lesions which could aid in localizing the neoplasm. There was mention of a slight right facial paralysis, but it was so slight that he was not able to satisfy himself of its existence. The presence, also, of deafness on the right side, which was absolute and which, singularly, partly disappeared after the operation, had suggested a cerebellar tumor. All other motor or sensory symptoms were absent, the hand-grasp was equal and excellent on both sides, and there was nothing abnormal in the walk evidencing the slightest weakness; the muscles were well developed and the reflexes approximately normal. At no time was there the slightest tendency to any staggering in the gait nor any inclination to move or fall to one side, anteriorly or posteriorly. There was no inco-ordination nor did the patient complain of dizziness or vertigo to any extent. On these grounds Fisher and Erdmann excluded a cerebellar growth, though they bore that lesion in mind, and which, in fact, the tumor turned out to be. A second interesting point was the long duration of the growth without the production of any mental deterioration; and a third point was the complete relief from pain which followed the operation and which continued until the symptoms of basilar meningitis manifested themselves.

The autopsy showed the cause of death to have been a purulent meningitis at the base of the brain extending down the cord. This evidently was of recent origin and occurred probably not more than ten days before death.

In reporting a case of tumor of the cerebellum which ended fatally W. P. Munn, of Denver, ¹⁰¹_{v. 8, No. 2} states that the points to be especially remembered in operating are: 1. That the space between the superior and the inferior curved lines is exceedingly variable in different skulls, being but little more than one-fourth inch in some and as great as an inch and a half in others. 2. That the area thus available for operative attack will not only influence the operator in his choice of instruments for making the primary opening in the skull, but may make or mar the successful completion

of the operation by rendering the lateral sinus more likely to be encroached upon. Several sizes of trephines should be provided, so that the size most suitable for the space available for attack may be employed. If the area is very small the chisel will necessarily be employed. 3. That the primary opening should be made at least one-fourth inch from the median line and, if possible, the same distance from the superior curved line. This width of bone may be slightly, but carefully, infringed upon in enlarging the opening with the bone-biting forceps. 4. That the occipital bone usually thins rapidly from above downward,—a fact which must be remembered in the use of the trephine and also of the chisel and the rongeur forceps.

Epilepsy.

Von Bergmann, of Berlin, ⁵⁷_{June 23, '95} points out that a cure cannot be expected from surgical treatment except in those forms of epilepsy due to a lesion of the cortical motor centres. He strongly disapproves of the extirpation of apparently healthy portions of the brain, but which are suspected to be the origin of the epileptic seizures. Extirpation is only indicated in cases in which a distinct lesion, such as a cyst, is present.

C. A. Wheaton ¹⁰¹_{June, '95} also regards surgical procedures as of doubtful utility except in cases of traumatic origin or in well-marked focal or Jacksonian epilepsy. Eulenberg ⁴_{No. 15, '95} emphasizes especially the lack of definite indications for operation, and regards as impracticable the classification of epilepsy into a traumatic, an idiopathic, a general, and a partial form. It is questionable how far traumatism enters into the etiology of any case, and the partial character of the attacks can seldom be positively determined. Eulenberg also rejects the designation "cortical epilepsy," since every epilepsy has its starting-point in the cortex and has probably been at some time of a partial character. It follows, therefore, that the indications for operations must be determined by careful analysis of each case, and that the form of epilepsy is of itself no contra-indication.

T. H. Manley, of New York, ¹⁰¹_{Sept., '95} believes there can be no question that, in a considerable number of the most aggravated type, though surgery cannot promise a permanent arrest of the convulsive seizures, it may very greatly reduce their frequency and severity, relieve the congestive state of the vessels of the brain, diminish the dizziness and headaches, replace despondency by buoyancy of spirits, and produce an entire psychical change for the better in the individual. In the Jacksonian and traumatic types, though a definite cure cannot be guaranteed, a mitigation

of symptoms and a removal of those conditions which, if left undisturbed, in many are liable to lead to serious symptoms later in life, may be assured to the patient.

In the opinion of Eugene Foster, of Augusta, Ga.,²⁰⁷_{Oct., '95} trephining has its legitimate scope in the treatment of symptomatic epilepsy, though an exceedingly narrow one so far as curing the affection is concerned. In selected cases it is to be highly commended for the one purpose, if no other, of removing the possible cause of persistence of the convulsive seizures. Excision of cicatrices of the brain or dura, however, is, in his opinion, rarely necessary or even justifiable. Excision of healthy motor centres has no rational place in the treatment of epilepsy. Some operators speak of relieving brain-pressure by merely removing a button from the skull, and seriously recommend the practice in epilepsy. Unless hernia cerebri result or the membranes be punctured and the cerebral fluid removed it is impossible for brain-tension to be thus relieved. Taking a button out of the patient's heel would afford as much relief from brain-pressure as the mere taking out of a button from the skull. If any benefits result from such an operation they are due purely to the moral effect.

Repeated borings into the cranium to locate a lesion because previous operations showed that, the supposedly diseased section being healthy, the injury must be in another place is unscientific and unjustifiable. Finally, trephining is only justifiable as a *dernier ressort* in symptomatic epilepsy and has no legitimate position in the treatment of idiopathic epilepsy.

Successful cases of trephining for epilepsy are recorded by Angelucci,¹¹⁹⁶_{No. 12, '95} Butlin,²_{Nov. 17, '94} Lusk,¹_{Oct. 27, '94} Ferguson,¹_{Oct. 27, '94} and Colvin,¹_{Oct. 27, '94} and cases much improved by operation by Foxwell,²_{Nov. 24, '94} and Thorburn.²_{Dec. 29, '94} Ashhurst, of Philadelphia,¹¹⁹_{June 29, '95} has trephined in three cases; one, an epileptic with suicidal tendencies, remained much benefited so long as he was under observation; in the other two cases there was no evident improvement, though both did well as regarded the operation.

Schlesinger, of Vienna,³_{June 19, '95} reports a case of Jacksonian epilepsy cured by trephining, and Deschamps, of Liège,³⁷⁸_{Feb. 5, '95}; Frey, of Vienna,¹⁴_{Aug. 4, '95} and Hallager, of Viborg,⁹⁴_{May, '95} also describe cases. E. Leyden, of Berlin,⁴_{Sept. 10, '94} reports a successful case in which the original small lesion in the bone of the skull was exactly above the right cortical centre of the left lower limb. The time elapsing between the original injury and the first epileptic attack was about twenty-four years. Notwithstanding this long period, the clinical analysis of the epileptic symptoms placed the lesion with certainty in the motor cortical region. Though but

slight anatomical changes were found at the time of the trephining, there occurred, four weeks after the operation, a marked improvement, which, in the course of four and one-half months, ended in nearly complete recovery.

F. Marsh presented to the Midland Medical Society ^{May 4, '95} two cases of traumatic epilepsy treated by trephining, without recurrence of the symptoms for thirteen months in one case and eight months in the other. J. Madison Taylor, of Philadelphia, ²⁴²_{Apr., '95} also reports a successful case.

J. T. Eskridge, of Denver, ⁹_{Oct. 13, '94} records three cases of trephining for epilepsy, two of them being of the Jacksonian type and the other due to old meningeal hæmorrhage. Improvement occurred in all.

It was difficult to state the nature of the lesion which caused the symptoms in a case under the care of W. Anderson, of London, ⁶_{July 27, '95} but there could be no doubt as to the benefit produced by operations. The last report states that the patient is in good health, free from fits and paralytic symptoms, but his intelligence is still incomplete and his education at a stand-still.

Postempski ⁵⁸⁹_{p. 801, '94} describes the technique of craniotomy by Scaff's method for Jacksonian epilepsy. In the first stage of this operation a linear incision ten centimetres long is made in the soft parts and in the skull along the digital suture parallel with the upper extremity of the fissure of Rolando. The soft parts are then united, and eight days later a horseshoe-shaped incision is made, the two extremities of which meet the ends of the first incision, the Rolandic area being thus circumscribed. The bony fragment is easily lifted up, owing to the furrow. In performing the operation Postempski proceeded directly to the motor centres of the face and arm, which were the first affected in the epileptic attacks, and performed superficial excision, replacing the bony covering. The results of the operation were satisfactory, but the author does not clearly indicate the functional results.

George Woolsey, of New York, ⁵⁹_{Aug. 24, '95} describes a case in which he removed a bone-flap from the skull for the relief of convulsive and mental symptoms. The boy lived a year and eight months, and improved a part of the time, but gradually grew worse. The points of interest in connection with the case were: (1) by beveling the chisel only on the inner surface the blows of the mallet were slanting and caused less concussion of the brain than where the chisel was ground on both surfaces; (2) a number of temporary overlapping sutures through the scalp *en masse* prevented hæmorrhage; (3) the method of operating was shown to be applicable even where the skull was enormously thickened; (4) that

the inner flap might heal promptly, without adhesions to parts beneath, with smooth inner surface; (5) that the dura, after incision and suture, with use of drainage through the lateral ventricle passing through the suture for two or three days, might heal without adhesion to either bone or pia. Dawbarn, in the discussion, said that he could not imagine a more successful plan for the prevention of hæmorrhage from the scalp-wound than that suggested by Keen, of tying a rubber tube around the head. He had used it many times and with the result of securing an absolutely dry wound. There were two objections to chiseling the bone,—namely, danger of the chisel slipping and of producing concussion of the brain.

Faguet and Lowitz¹⁸⁸_{Apr. 21, '95} record a case in which trephining was done for Jacksonian epilepsy and hemiplegia in a syphilitic patient of 40 years. Death followed in twelve days, and at the necropsy a gumma as large as a walnut was found on the posterior third of the second frontal convolution in the right hemisphere. There was no lesion of the psychomotor zone,—an interesting point in connection with the persistence of the hemiplegia after trephining.

In a case of traumatic epilepsy operated on by Willy Meyer, of New York,⁹⁶_{Mar., '95} it was not practicable to close the gap by a skin-bone flap; so a celluloid plate, three by three and one-half inches, was used, Fraenkel's method being followed. The celluloid was put directly upon the bone and covered by the periosteum and other tissues of the scalp, these being separately stitched with catgut up to the two ends of the incision. Here a small-sized drainage-tube was carried out in order to give exit to the blood which slightly oozed from the exposed brain. To enable proper drainage two narrow slits had been cut into the plate. Through these the tubes passed underneath the plate. The wound healed by primary union. The drainage-tubes were removed on the eighth day at the first change of dressing, and the patient discharged on the fourteenth day after the operation with the wound firmly closed. At first, after the operation, the pulsation of the brain was transmitted through the plate. Six weeks after healing had taken place it felt perfectly firm and free from pulsation. Meyer hoped that the operation might in this case have a real curative effect, as the brain, which had been formerly caught in the narrow hole, was now entirely relieved from pressure.

Leonard Freeman, of Denver,⁵⁹_{Aug. 3, '95} in reporting two cases of trephining for traumatic epilepsy, remarks that the advice given by some authors, to cover the entire dressing with a sheet of rubber dam, is not wise, as it checks evaporation and keeps the dressing

moist. For the same reason it is better not to use a starch-bandage, or even a common muslin roller, for the final covering, but a bandage of simple gauze. If the discharge soak through or appear at the edges of the dressing, a new dressing must be applied at once, as micro-organisms rapidly grow into the moist material. When the dressing becomes stained through, it is a mistake to cover it up with more cotton. The danger is not removed, but only concealed; for we can rest assured that infection has occurred as soon as the staining manifests itself. It is practically immaterial whether one use plain gauze, iodoform gauze, or that impregnated with various antiseptics,—only it must be dry and surgically clean. Plain and freshly-sterilized gauze is, he thinks, the most reliable and satisfactory. Where a steam-sterilizer cannot be obtained, gauze and cotton may be easily prepared by placing them, very loosely packed, in a pan in the oven of an ordinary cooking-stove. When the cotton begins to brown on the surface the material is sterilized.

[Warren, of Boston,⁹⁹_{July 4, '95} in describing a case in which operation did not produce great improvement, dwells on the importance of the post-operative treatment of epilepsy, for even after operation the habit of epilepsy remains. The operation should, therefore, be supplemented by a very thorough course of the bromides,—a point also emphasized by Lauphear, of St. Louis,¹⁰¹_{Sept., '95} who believes that medical treatment should be continued for at least two years after operation.]

Idiocy and Microcephalus.

Sir George Humphry²⁷⁷_{Jan., '95} states that he found no evidence in the examination of nineteen idiot-skulls to suggest that the deficiency in the development of the skull was the leading feature in the deformity, and that the smallness of the bony cerebral envelope exerted a compressing or dwarfing influence upon the brain; neither could he find anything to give encouragement to the practice, lately adopted in some instances, of removal of a part of the bony case with the idea of affording more space and freedom for the growth of the brain. In these, as in other instances of man and the lower animals, the brain-growth is the determining factor, and the skull grows upon and accommodates itself to the brain whether the latter be large or small. This view is corroborated by the fact that, in the brains taken from two idiot-skulls in St. Bartholomew's Hospital, as well as in other instances, as those shown by Cunningham, the convolutions of the brain give no indication of compression, but are free, outstanding, and separated by well-marked sulci.

Carl Beck, of Chicago, ⁶¹_{Nov. 3, '94} in a thorough study of craniectomy in microcephalus, offers the following conclusions:—

Craniectomy is a justifiable operation and apt to be successful in the treatment of microcephalus with idiocy. The success depends on the kind of microcephalus and the degree of idiocy. Acquired and late forms give a better prognosis than congenital forms. The danger of the operation is not very great. The operation should be quite extensive,—that is, the incision in the skull large enough to permit dilatation,—and the circular method of Gersuny should be given a trial, thorough pedagogic treatment being afterward instituted.

The mortality in seventy-two reported cases is 17 per cent. The dangers of operation are shock, hæmorrhage, and infection. As a means of lessening shock the chisel and hammer should be discarded, the operation performed as rapidly as possible, and hot applications made to the head. Bleeding from the skull can be checked by an Esmarch rubber band fastened tightly around the head. Should the dura be injured it must be sewed. Of the 12 fatal cases, death was due in 6 to shock, 1 to heart-failure, 1 to loss of blood, 2 to infection, and in 2 no cause was assigned.

Rie ²²_{July 3, '95} showed to the Medical Society of Vienna the cranium of a child on whom he operated in January, 1893, for idiocy and microcephalus. The section appeared to be almost closed, thus demonstrating that bone in the cranium will repair after operations where extensive defects are necessarily left. The fontanelle and the porencephalus had both closed up. This shows conclusively that the operation is not beyond the limit of surgical propriety.

Piéchaud, of Bordeaux, ¹⁴_{Sept. 1, '95} has performed craniectomy in eight cases of idiocy, with one death. The results, as regards mental development, were not remarkable. Spanbock ⁷⁵_{Sept. 15, '95} records a case of imbecility improved by craniectomy. The patient, a boy of 14, made a good recovery from the operation, but at first showed no change in his mental condition. Improvement began within two months, however, and, with occasional relapses, until at the end of the year there was distinct permanent improvement, both intellectually and morally. The moral change was most striking and complete; the tendency to stealing, lying, abusive language, etc., disappeared, and the patient became an industrious, trustworthy person.

[The good result of the craniectomy is difficult to explain, but the author suggests that it is due to the greater space allowed for the development of the brain, that the œdema of the brain mentioned disappeared owing to the increase of space, and that

some external factor, perhaps the faradic current used, affected the brain when exposed.]

Hudson, of London, ²²_{Sept. 25, '95} in reporting a case of craniectomy, states that if a limited improvement followed surgical interference it might be justifiable later on to make a similar linear gap on the right side.

Improvement was noticed after the second operation in a case described by Ord and Cotterell, of London, ²_{Mar. 2, '95} and two others were subsequently undertaken, the patient becoming like an ordinary child, running and walking about and with every indication of good eyesight. The bones of the skull were found to be much thinner than normal, and there was often little or no diploë to be found. On removal of the pieces of bone the dura mater usually bulged into the groove. [The great point in these operations, according to these authors, is to avoid hyperpyrexia and shock. The former may usually be averted by only taking away a small piece of bone at each sitting, taking good care not to bruise the subjacent brain-substance and applying an improvised Esmarch bandage to prevent hæmorrhage.]

Shuttleworth ⁶_{Aug. 10, '95} expresses a strong opinion against operative measures in cases of microcephalus. The premature synostosis he regards not as a cause of the brain-defect, but as an associated defect or perversion of development. In certain cases of local epilepsy and in some cases of hydrocephalus operation may be indicated, and it may also be justifiable in certain cases of congenital syphilitic brain disease.

John Ford Barbour, of Louisville, ¹⁹_{Oct. 12, '95} has also arrived at the conclusion that premature synostosis of the cranium does not occur in idiocy, the arrested growth of the skull being due to the arrested development of the brain, and not *vice versâ*. The lesions to which idiocy are due are profound, varied, extensive, and by no means susceptible of relief by craniectomy. The results obtained by operation are slight, doubtful, or *nil*.

Telford-Smith, of the Lancaster Asylum, ¹⁵_{Sept., '95} relates the after-history of two cases of craniectomy for microcephalic idiocy, and agrees with the idea now generally held,—that any good arising from the operation is due as much to the careful after-training always instituted as to the operation itself.

Hydrocephalus.

Picqué, of Paris, and Février, of Nancy, ¹⁴_{Oct. 28, '94} from a study of the pathological anatomy of hydrocephalus, conclude that distension does not explain all the lesions, as, for instance, the widening of the occipital foramen and the spinal canal, the absence of

certain portions of the nervous system (corpus callosum), and the heterotopic nodosities in the gray substance. Attempts at surgical treatment have thus far been unsatisfactory, twelve out of thirteen cases dying, and the survivor, operated on by Broca, remaining an idiot. Even when the fluid is allowed to flow out slowly, in order to avoid a too sudden evacuation, the death of the patient, often within twenty-four hours, is not prevented.

Pott, of Halle, ²²_{Nov. 13, '95} believes that a distinction must be drawn between congenital and post-partum hydrocephalus. In the former only two spaces are found filled with fluid. He attributes hydrocephalus to an obstruction to the flow of the cerebro-spinal fluid. As regards the post-partum form, it generally arises in the first half-year of life, following various infectious diseases, such as syphilis, tuberculosis, and also rickets. Treatment is as good as useless; puncture brings about a temporary improvement and sometimes causes improvement in symptoms due to brain-pressure, but the fluid collects again and the children die from marasmus due to great loss of albumin. He has also seen no good results from Quinke's lumbar puncture, not even when a drain was left in. Hochsinger, of Vienna, has seen the progress of the disease brought quite to a stand-still, but has never seen a *restitutio ad integrum*. A fatal case of hydrocephalus operated on by puncture is recorded by Romniciani. ⁶⁶⁰_{Sept. 15, '94}

Billhaut, of Paris, ¹⁵²_{Dec. 7, '94} in a paper before the French Surgical Association, expressed the opinion that the surgeon commits a mistake in resorting to operation for the cure of this disease. The etiology, the malformations present, and the anatomo-pathological disorders which attend it, all attest the truth of this assertion. The only cases in which operation would likely be successful are those in which there is no risk and in which the classical medical treatment would also bring about good results. When hydrocephalus is the symptom of a material lesion, such as meningo-encephalitis, tumor, or degeneration of the cerebellum, surgical treatment is illogical, as it does not attack the origin of the trouble. Statistics of the cases in which operation has been attempted go to show that the method should be abandoned.

Raczski ⁸¹⁴_{No. 20, '96} ¹⁰¹_{Nov.} regards puncture as not a dangerous procedure if carried out under antiseptic precautions, and if the fluid be evacuated in small quantities at intervals of several weeks. The employment of permanent drainage is more dangerous than evacuation of the fluid by puncture or even aspiration. Although the results thus far obtained have not been brilliant, the statistics will be improved when the operation is resorted to at an earlier stage, before much thinning of the brain-substance has occurred.

According to the author's opinion, puncture is indicated in those cases in which, in a previously healthy child, symptoms of hydrocephalus rapidly develop; if a progressive enlargement of the head be distinctly noticeable; if marked bodily or mental impairment be threatened; in short, if there be everything to gain and nothing to lose. Stephen Paget¹⁰⁷⁷_{Oct. 10, '94} treated a case of acute hydrocephalus, in an infant 9 days old, by means of drainage, the child living six weeks. He emphasizes the ease with which such an operation may be done in infancy.

It is stated in the "American Text-Book of Surgery" that there is no case on record of permanent recovery from aspiration of the lateral ventricles, but Roswell Park, of Buffalo,¹⁹_{June 1, '95} believes himself in a position to contradict this statement, although recovery may not have occurred after cases treated as deliberately as one of his own. In all, about 100 cubic centimetres ($3\frac{1}{4}$ ounces) of fluid have drained away from the ventricle in this case. The child died, a few weeks later, of sheer inanition, without the slightest sign of sepsis nor reason for attributing death to the operation. A fatal case of this kind is recorded by J. J. Still, of Los Angeles.⁴⁴_{Oct., '95}

Insanity.

René Semelaigne³⁶¹_{May, '95} reviews the surgical treatment of insanity and the indications for its employment. According to the partisans of the method, it is perfectly justifiable in desperate cases, the operation of trephining being entirely harmless if properly performed. Putting aside the few accidents which have occurred, and admitting, with Lucas-Championnière, that the danger does not depend upon the trephining, but upon the lesion, it remains to be seen whether operation is of any utility. In recent injury with consecutive delirium it may be indicated after due consideration of the individual case. As regards intra-cranial pressure, the author finds that all writers are not in accord, even in England, and the time has not yet arrived when the trephine may be reckoned among the methods of treatment in general paralysis. As to more or less complete excision of certain parts of the cortex, this seems altogether unacceptable.

Binet and Rebatel, of Lyons,²¹¹_{May 12, '95} describe the case of an officer who was struck by a shell in 1870, during the Franco-Prussian war, the injury being received behind the left ear, above the mastoid apophysis, but without fracture or depression of the skull. He was taken prisoner and during his captivity suffered from cerebral symptoms with loss of consciousness. When he was liberated his health was good and he followed a military

career until 1888. At this period, after excessive fatigue, delirium supervened, followed by hallucinations and melancholy, and in 1889 he had an epileptiform attack, the symptoms of insanity then becoming marked. Medical treatment being of no avail, trephining was done in 1893. In the absence of distinct localizing symptoms the fronto-parietal region was selected, the trephine being applied four times. No lesion was found, the dura and pia mater being both healthy. From the day of operation an absolute metamorphosis took place in the patient, who has since remained cured. The case, in the opinion of the authors, corroborates the view that violent blows on the head by missiles of war are usually the cause of grave cerebral affections, and they agree with Poncet that all cerebral disturbances following traumatism may warrant operation. In the discussion of the case Lépine recalled the case of a young man who was completely cured of epileptic attacks on one side by trephining on the opposite side of the head. He believed the case to have been one of hysteria, as he had since learned that the man had had an attack, with loss of consciousness, while with his regiment. Certain forms of hysteria may simulate Jacksonian epilepsy, the mechanism of which we do not understand.

Two successful operations for traumatic insanity are recorded by G. W. Cale, of St. Louis. ¹_{Oct. 12, '95} A review of the literature led him to conclude that insanity due to injuries to the head is of rather infrequent occurrence. In 2200 cases of insanity treated by Kiernan 45 were of traumatic origin, while Hays records 61 due to the same cause out of 2500 cases. Thus it will be seen that about 2 per cent. were traumatic. Schlager reports 500 cases of insanity due to concussion of the brain. Both his patients were injured near the crossing of the interauricular and median lines. As four years in one case and three years in the other have elapsed since the time of operation, he feels warranted in stating that both patients are entirely cured.

Paralysis.

T. C. Shaw ¹⁶⁶_{Oct., '94} states that trephining of the skull in general paralysis should be done in the early stages of the disease, as at a later date, when there is much thickening of the membranes and destruction of tissue, little beyond relief can be expected from operation. The object is to relieve pressure,—the dull, heavy, or throbbing pain that patients complain of, which seems, from its character and diffuseness (it is commonly described as a “weight” or a “feeling of tenseness”), to be of the kind experienced in ordinary meningitis, where the flushed face and quick pulse and swelling of the brain denote pressure in a sense that cannot be doubted.

John MacPherson, of Stirling, ¹⁶⁶_{Oct., '94} in a consideration of the

same subject, states that such operations are quite justifiable on the ground that they are eminently safe and practically unattended by any mortality when carefully performed. He reports five cases of general paralysis operated on by Wallace, of Edinburgh, at the Stirling Hospital, the first (a female) manifesting but slight symptoms from the beginning, leading to the supposition that it was an early case. It was, however, well advanced and ran the ordinary course of the disease unaffected by the operation. Another (male) case was so advanced at the time of the operation that the escape of compensatory fluid left a space between the pia and the skull-cap equal to half an inch. The patient lived for eighteen months after the operation, and the course of the disease was evidently checked. The three other cases were still living at the time his report was written, and the disease arrested at the stage it was in when operation was performed, more than two and one-half years ago; that is to say, they were still insane. These results, in the opinion of the author, are strikingly significant and suggest the possibility that, could general paralysis be diagnosed at a sufficiently early stage, operative interference might check its progress.

An interesting case of trephining for infantile hemiplegia is described by Angell.²¹²_{Oct., '94} The patient was a child, aged 6 years, suffering from infantile hemiplegia affecting the right side. The birth was difficult and prolonged, and the condition apparently arose at that time. The child had the usual condition of mal-development on the affected side; it was mischievous, irritable, and dirty in habits; quite unable to use the right hand, and suffered from daily epileptiform attacks. Trephining was performed and a cyst punctured, but no attempt was made to remove it. With the exception of a severe convulsion and a high temperature a few days after the operation, the result of the pressure, apparently, of a too tight bandage, the patient's progress was excellent. The child was soon taught to be cleanly, began spontaneously to use the right hand,—feebly and awkwardly, of course,—and ceased to have convulsions. Six months after operation the condition was still improving. There had been no fits and the mental improvement was maintained. In the discussion of the case Mills considered it presumable that the cyst which had not been opened was a porencephalic cavity, and that opening and draining it would have been useless. Putnam agreed with Mills. He said it was rarely possible to remove a cyst satisfactorily. In a case seen by him the cyst had been tapped and the drain left in. Improvement had followed. Angell expressed the belief that his was not a case of porencephalus, but was an arachnoid cyst from a meningeal hæmorrhage.

Wood and Cotterell,⁶_{Feb. 16, '95} showed to the Medical Society of London two patients suffering from right hemiplegia and epilepsy who had been trephined. Cotterell said that, in the first case, he found a cyst connected with the arachnoid which was probably an old hæmorrhagic extravasation. In the second case the dura mater was found to be thickened, but the arachnoid and brain were healthy. He did not interfere with the exposed cerebral cortex.

Meningitis.

Quinke, of Kiel, who was the first to advocate and practice puncture of the spinal sheath in cases of cerebro-spinal meningitis, whether of tuberculous origin or not, by means of a Pravaz syringe inserted between the laminæ of the lumbar vertebræ, slightly to one side of the median line,¹⁵_{Aug., '95} returns to the subject in an address before the Association of German Naturalists and Medical Men.⁶_{Oct. 19, Nov. 9, '95} His purpose is to emphasize the value of the procedure in diagnosis. He affixes a manometer to the trocar and thus measures the degree of pressure within the canal. Failure to secure a flow of fluid is to be attributed to imperfect performance of the puncture,—*e.g.*, the passage of the needle between the nerve-roots outside the sheath or the presence of thick pus, which will not flow through a too fine needle. He is convinced of the therapeutic value of the plan, especially in rapidly-developing forms of acute serous and sero-purulent meningitis. Von Ziemssen, in the discussion, confirmed Quinke's views. He, himself, had injected a weak solution of iodine into the canal by this means. He did not use a trocar, but a simple Dieulafoy needle. Sometimes the patient, shrinking at the moment of puncture, approximated the vertebræ and thus hindered the entrance of the needle, and he thought that anæsthetics should be given in the case of adults. No reaction followed, and in some cases examined after death no trace of the puncture could be found. In acute cerebro-spinal meningitis, which occurred sporadically in Munich, he had seen good results, as well as in serous spinal meningitis. It was surprising that in uræmia, in spite of the high arterial pressure, only a few drops of fluid are to be found in the cerebro-spinal sac. Lenhartz stated that, in a tuberculous case, after the escape of 100 cubic centimetres ($3\frac{1}{4}$ ounces), the patient grew worse. Von Ziemssen, in reply, said that in severe cases the patient will always die. Exceptions cannot disprove the rule. In many cases the favorable course was certainly to be ascribed to the puncture.

Stadelmann⁴_{July 8, '95}; ²_{Aug. 17} observes that, although the procedure is

generally easy, it may not be so in the case of restless and semi-unconscious patients. In tuberculous meningitis the fluid drawn off should be clear with tubercle bacilli in it, in suppurative meningitis turbid or purulent with pyogenic micro-organisms in it, and in cerebral abscess clear and without micro-organisms. Tubercle bacilli have not been found at times by some observers, although Lichtheim⁴_{p.259,'95} has never missed them. Clear fluid without micro-organisms may also exist in tumor cerebri, simple meningitis (Quincke), and even suppurative meningitis. The difficulty of distinguishing at times between cerebral abscess and meningitis is well known. If pus is drawn off by lumbar puncture suppurative meningitis must be present. Sometimes the fluid has been turbid only, but this is thought by Lichtheim to be exceptional. Stadelmann, however, records a case of suppurative meningitis secondary to fracture of the base, where the fluid was turbid and blood-stained; so that too much importance must not be attached to this point. He also records a case of fatal meningitis secondary to ear disease. Here clear fluid was drawn off during life and no tubercle bacilli or other micro-organisms could be found in it by cultivation or otherwise. Stadelmann thinks it doubtful whether a communication exists (at least, in the pathological condition) between the subarachnoid space and the cavities of the ventricles, and would account for the hitherto unexplained pain after aspiration, as well as the limited amount of fluid at times obtained, by the closure of this communication. He emphasizes the importance of the positive and the unreliability of the negative evidence obtained by lumbar puncture.

Quincke¹⁵_{Aug., '95} in performing the operation usually chooses a point between the third and fourth lumbar laminae. This is the best spot in children, but Chipault¹⁰⁹⁰_{p.11,'95} prefers for adults the space between the lamina of the last vertebra and the sacrum. Fürbringer⁴_{No.13,'95} has employed the method in eighty-six cases. He found tubercle bacilli in twenty-seven out of thirty-seven cases, which were afterward proved by inspection to be tuberculous meningitis. He extracted purulent fluid in a case of suppurative meningitis, and considers the method a valuable addition to our means of diagnosis, though from a therapeutic stand-point it has not justified the expectations of its author. No anæsthetic is required; the most convenient position is with the patient on his side with his back flexed. Aseptic precautions must be taken, and in an adult the needle must be introduced as deep as six centimetres.

Bernard²⁰⁰⁰_{'95} also believes that lumbar puncture may be of value from a diagnostic, but not from a curative, stand-point. He has

more confidence in trephining at the level of the Sylvian fossa, either on one or both sides, according to the localizing symptoms present.

R. Hirschberg⁶⁷_{p.411,'94} reports a case successfully treated by trephining and drainage of the subarachnoid space. The effect of the operation was remarkable,—the headache ceased, the pulse became more rapid, and the commencing coma disappeared, as well as the vomiting. C. A. Greaves, of Derbyshire,⁶_{Mar.23,'95} also reports a successful case.

B. Merrill Ricketts¹¹²_{Dec., '94} trephined a child for tubercular meningitis to relieve pressure-symptoms. Two openings were made over the right and left parietal bones and large quantities of serous fluid escaped. There was improvement immediately following the operation, but for a few hours only. The child died twenty-eight hours after operation. The operative cure of tubercular peritonitis has been accomplished so many times that Ricketts thought it worth while to try it in tuberculous meningitis.

A case of recovery after trephining recorded by James Kerr, of Bradford,⁶_{Oct.26,'95} was interesting from the fact that the whole course of the illness up to the time of the operation was typical of tuberculous meningitis. The slight localizing indications pointed to most irritation about the base on the left side. The neuritis was indefinite for localization,—it was taken, if anything, as in favor of the other symptoms. The operation was performed with the idea that the infection was most severe about the base on the left side; it was followed at once by disappearance of the headache. The remission of temperature after operation, noted in cases which have since been published, was absent in this case. It is possible that there was some massive tubercle about the base, and that there was an intercurrent attack of meningitis, but there can scarcely be a doubt that the operation relieved the symptoms and averted impending death. One would judge from this case that trephining is justifiable in tuberculous meningitis, if only to relieve headache, and ought to be done as soon as the diagnosis is clear, before the paralytic stage is reached, and that drainage can be kept up with advantage for a considerable time.

From a discussion of the subject before the British Medical Association, it appears that Cautley¹⁵_{Sept., '96} thinks but little good can arise from trephining in this disease. D'Arcy Power, on the contrary, though he has not yet saved a child by this means, has in six or seven instances seen a temporary improvement, and thinks that the operation is distinctly justifiable. Waterhouse refers to his well-known successful case, which still remains well, but anticipates that only in a few instances can recovery be expected, as

general tuberculosis so often co-exists. As regards drainage, a single tapping is absolutely useless, continual drainage for ten or fourteen days being essential, and this is possibly best secured through the occipital bone by lifting up the cerebellum.

R. Hamilton Russell, of Melbourne, ¹¹⁸⁷_{Aug., '95} records three cases unsuccessfully treated by subdural drainage.

Mammotti, ⁹²¹_{Aug. 1, '95}; ²_{Sept. 28} from experiments on dogs with regard to the surgical treatment of meningitis, concludes that after subdural injections of sublimate solution (1 in 4000) tuberculous meningitis may not only be alleviated, but completely cured. Moreover, the involution of meningeal tuberculosis may be verified even if treatment be carried out at an advanced stage of the disease, and results in the development of more or less firm adhesions between the dura and the pia mater. The mechanism determining involution seems in many points identical with that observed in peritoneal tuberculosis. The superficial underlying cerebral cortex appears to undergo slight atrophy, but the experiments are not as yet sufficiently prolonged to say positively what the ultimate condition of the cortex will be. The sublimate solution apparently does not act merely as an antiseptic, but probably by setting up inflammatory reaction. In acute suppurative meningitis the injections seemed of no advantage. About 1 or 2 grammes ($15\frac{1}{2}$ or 31 minims) of warm sublimate solution were used at each injection.

In giving notes of a case of trephining in meningitis, John Keay, of Inverness, ¹⁶⁶_{Oct., '94} recommends prophylactic measures when conditions likely to lead to meningitis are present. Otorrhœa should be regarded as a disease in which vigorous treatment is demanded, first by the ordinary cleansing methods recommended by aurists, and then, if the discharge persist, and particularly if it is offensive, containing pathogenic organisms or osseous *débris* indicating erosions of the bony walls, the case should be taken in hand by the surgeon. The mastoid antrum and cells should be opened and thoroughly cleansed, the whole of the tympanic cavity explored, and everything diseased, including even the ossicles, if necessary, freely removed. This operation may be said to be quite free from risk to life, and, though the sense of hearing may be impaired or destroyed on the affected side, this is a small matter when compensated by the removal of a disease which at any moment might affect the meninges of the brain and cord and destroy life itself. Even though it should be found that all diseased tissue cannot be removed, a free outlet for discharges is secured, and a barrier of connective tissue is formed to protect more vulnerable parts.

SPINE.

General Considerations.

Chipault and Daleine, of Paris, ⁸⁵³_{May, '95}, ²_{June 1}, in a study of the surgical anatomy of the spine in infancy, find that the spine of the fœtus and newborn infant, in relation to the whole length of the body, is longer than that of the adult, owing to the slight development of the lower limbs. The relative length varies at different periods of life, while the relative proportions of the dorsal segment and the cervical and lumbar segments taken together vary but little during growth. The cervical segment, which at birth exceeds the lumbar segment, becomes relatively smaller with advancing age, until in the adult the latter is one-third longer. While in the adult the umbilicus corresponds to the level of the third lumbar spine, in the infant it is opposite to the fourth spine or even lower. The base of the sternum corresponds, in the infant, to the top of the seventh cervical spine, instead of, as in the adult, to the second dorsal spine. In the newborn infant the spinal cord descends but a little below the upper part of the spine of the first lumbar vertebra. While in infancy the lower limits of the cervical and lumbar portions of the cord vary but slightly from those in the adult, the lower limit of the dorsal portion corresponds to the eighth, and not, as in the adult, to the ninth dorsal spine. The cauda equina in the infant, instead of forming, as it does in the adult, a cylindrical mass which fills up the dural sheath, is arranged in two distinct processes occupying the sides of the canal and separated by an interval of from three to five millimetres in width, occupied by cerebro-spinal fluid. The spinal canal might thus be punctured in the third or fourth lumbar space in the infant without risk of wounding the cauda equina. Laminectomy, it is pointed out, may be performed under much more favorable conditions on the infant than on the adult. In the former the laminæ may be easily resected, the fatty tissue around the dura mater is much less vascular, and the periosteum, which can be readily detached from the bone, is capable of throwing out fresh osseous structure and of repairing the breach made during the operation in the posterior wall of the canal.

The surgery of the spinal cord, as regards its present and future position, is thoroughly reviewed by William Thorburn, of London, ²_{Oct. 27, '94}, who prefers the term "laminectomy" to "laminectomy." The latter, however, has been generally accepted and is more suitable than the older terms "trephining the spine," "vertebral resection," "rachiotomy," etc. Thorburn does not look upon the danger of the operation as being great, especially in view of the conditions for which it is performed.

S. Stillman, of San Francisco, ¹⁴⁷_{Oct., '94} reports three cases of laminectomy in the service of Ellingwood, which he believes illustrate the fact that extensive exposure of the spinal cord may be made without great danger to the patient and without much subsequent deformity or weakening of the spinal column. In the third case—one of dorsal Pott's disease with pus and a sequestrum pressing on the cord—the lesion appeared to have been completely cured by the operation, the symptoms of pressure having been arrested. Firm fibrous union took place, with but slight deformity.

A. Hewson exhibited to the Philadelphia Academy of Surgery ¹_{July 20, '95} a forceps which had been successfully used in four laminectomies. The blades were set at an obtuse angle to the handles so as to facilitate cutting the laminae. The upper cutting blade was serrated like the teeth of a saw. The lower, which was also a cutting blade, had at its extremity an horizontal projection, similar to that on the bandage-shears, which was to be inserted beneath the laminae and served to keep the blade in position while cutting the bone. The handles were much longer, to give greater leverage. The new point to which the speaker directed attention was the divided spring. All the other instruments of this kind were provided with a single spring, which kept the blades apart. In this instrument the spring was divided so that it could be turned back when not in use, and, when extended, the full power of the spring was exerted to open the blades. He had found this a very useful appliance and had used it both on the living and on the dead body. It greatly facilitated opening the spinal column for removing the cord, and for this purpose was much better than the spinal saw.

C. H. Golding-Bird, of London, ²_{Jan. 5, '95} has found the flap method preferable to the linear incision in operating upon the spinal column, whether for disease or traumatism. The linear vertical incision, though it unites at first, may, under the pressure of the spinous processes as the patient lies in bed, break down, especially where, in a traumatic case, there has been much bruising. Such an accident has occurred in his practice. In operating for fractured spine on two adults, both in the dorsal region, he made a horseshoe flap with the convexity upward and crossing the middle line between two vertebral spines, well above the area of injury. The sides of the flap were prolonged downward, parallel to the spine, as far as requisite. In both cases primary and sound union followed; there was no pressure on the scar, since it only crossed the middle line of the spine once, and then between the prominences of two vertebræ.

Injuries.

The cause of fracture of the laminae, the most important form of injuries of the spine, has generally been stated to be direct violence to the spine, but in four out of ten cases seen by Thorburn, of London, ²_{Oct. 27, '94} there was certainly no direct violence, and in only three was such violence distinctly described; while the frequency of this injury in conjunction with a fracture of the bodies indicates a similarity in the mechanism of their production. The symptoms of fracture of the laminae are by no means definite, and the only case in which diagnosis was made before death owed its detection to the distinct lateral mobility of a spinous process. The diagnosis is therefore difficult, and only the following points can be relied on: 1. The cause, if there be a clear history of direct violence. 2. The normal contour of the spine and the presence of lateral mobility of one or more of the spinous processes in conjunction with an obvious lesion of the spinal cord. In these cases laminectomy is clearly indicated if there be any symptoms of pressure on the cord. Thorburn would operate in compound fractures, and also in simple fractures and dislocations of the bodies of the vertebrae, if there is a reasonable probability that the injury is due to hæmorrhage; but in all other cases of this nature there is not much hope from operation unless the injury is below the level of the first lumbar vertebrae. In such cases, however, laminectomy is an eminently valuable surgical procedure.

Biddle ⁷⁸⁷_{Apr. '95} states that an exploratory incision affords the only means of ascertaining the extent of the injury, for the vertebral column is so thickly covered by muscles that it is impossible to detect the usual symptoms of fracture-crepitation and preternatural mobility. The extravasated blood is allowed to escape, thus preventing a possible abscess. The spines of the vertebrae should be removed near the seat of injury, thereby preventing pressure with bed-sores.

Dundore, ⁹_{Nov. 24, '95} in reporting three cases of laminectomy performed by J. C. Biddle and himself, expresses the opinion that, though the results of this operation for fracture and dislocation of the vertebrae are very uncertain, it is an imperative duty to practice it unless the patient is actually in a dying condition. The patient is afforded a chance for improvement, with little if any danger of shortening his lease of life, provided the operation be performed aseptically.

H. C. Wyman, of Detroit, ¹_{Oct. 6, '94} states that the vertebral canal may be opened so that the lateral and posterior aspects of the spinal cord can be easily examined by first making an incision through the integument and superficial fascia, four inches long,

over the spinous processes nearest to the diseased area of the spinal cord, and cutting away the muscles and tendons from their attachments to the spinous processes and the laminae. For this purpose it is well to use a strong knife and periosteal elevator, so that the periosteum may be turned back with the tendons and muscles, as it subsequently becomes useful in filling in the boneless area. A pair of strong retractors with teeth are commonly needed to hold back the soft parts so that the laminae can be divided with a chisel and bone-forceps. After the laminae on each side of the spinous process have been cut through the latter is caught with a strong forceps and lifted from its bed, exposing the vertebral cavity and the dura mater. A considerable space normally exists between the dura mater and its investing wall of bone. Through an opening made by lifting out the spinous process and lamina of one vertebra the cord can generally be examined the distance of an inch above and below the opening. It is not often necessary to remove more than the posterior segment of one vertebra. If the chisel and bone-forceps are used cautiously, and no more bone is removed than is necessary to overcome the pathological conditions on which the operation rests, there will be no need of splint or other apparatus to support the spine during the healing of the wound. A gauze-and-cotton dressing should be applied, and changed as often as it becomes soiled. In closing the wound, care should be taken to close the periosteum and muscles over the boneless area with silk sutures. Drainage is rarely needed, as gravity accomplishes the purpose.

Goldscheider, of Berlin, ⁴_{Dec. 17, '94; Jan. 7, '95} is not in favor of early operating in any but exceptional cases, and generally confines himself to orthopaedic measures. When paralysis persists and there is evidence of fracture of the arch, operation may be indicated. It is most warranted in fractures of the lumbar vertebræ after a certain period has elapsed. From the results of a case of his own W. J. Ferguson, of Sedalia, Mo., ¹⁰²_{Nov., '94} believes that operation should be undertaken as soon as the diagnosis is certain.

The favorable result in a case reported by R. H. M. Dawbarn, of New York, ⁹⁶_{Jan., '95} was attributed by him to the immediate operation. If it had been postponed a week or longer the result would have been much less favorable. [In the discussion of this case Wyeth emphasized his view, previously expressed, that in all cases of injury to the spinal column with resulting paralytic symptoms operation should be done early, if at all. There was then a much better chance of recovery, for where compression from hæmorrhage or depressed bone was allowed to remain weeks or months the resulting damage was likely to prove permanent.]

Abbe, on the other hand, and Gerster maintained that many cases of injury recover without operation. The paralysis is not always due to crushing of the cord, but may be due in part to hæmorrhage, and this may be between the dura and vertebræ, between the dura and cord, or into the parenchyma. In either event the recovery may be slow. Abbe did not indorse operation in all cases and regarded it a serious matter to add to the existing shock that of an early operation, with the further risk of considerable hæmorrhage and the chance of finding a pulpified cord.

An interesting case of laminectomy for compression due to fracture of the spine is recorded by Salzer, of Amsterdam, ⁵⁸³ ² Nov. 17, '94; Dec. 29 the operation being performed in two stages with an interval of eight days. At the first, the abscesses were opened, the incision extending from the sixth to the twelfth vertebra. After cleansing the openings with sublimate (1 in 3000) the long muscles of the back were kept apart by tampons of iodoform gauze. At the second operation the arch of the tenth vertebra, and afterward those of the ninth, eighth, and seventh, were removed, especial care being taken to preserve the periosteum. The consistence of the exposed dura mater, however, being absolutely normal and the pulsation of the cerebro-spinal fluid distinctly visible, it was clear that the injury had to be sought in the other direction. The removal of the arches of the eleventh and twelfth vertebræ disclosed a dislocation of the spine, the part of the column situated above the fracture having been pushed over the part situated below it. This had caused a narrowing of the spinal canal and a flattening and compression of its contents. Notwithstanding the removal of six vertebral arches and the fragments of the fractured vertebral body not having been restored to their relative position, the spinal column, either by the renovation of connective tissue or perhaps by bone regeneration, was now capable of sustaining the trunk without any supporting apparatus. The patient could again move freely about and perform some light work. In order to lighten the strain on the spinal column he was, however, advised to wear a corset permanently. Successful cases of laminectomy for fracture are published by F. Winnett, of Toronto ³⁹ Jan., '95; Enderlen, ³⁰¹ Mar. 22, '95 and Ballance, of London. ² Mar. 30, '95

Le Dentu, of Paris, ³⁵ Aug. 3, '95 prefers the expectant plan,—late trephining and resection at a suitable moment. He regards intervention as useless when the injury to the cord is profound or when the patient is on the eve of such accidents as disseminated sclerosis.

Victor Horsley, of London, ⁶ Aug. 17, '95 believes that in an ordinary case of injury extension should be tried for six or eight weeks.

F. S. Dennis⁹⁶_{Mar., '95} advises that traumatism of the spine, with or without compression of the cord, even the most unpromising cases, be immediately subjected to extension and counter-extension and then immovably fixed by Sayre's jacket. Recovery has followed fractures of the lower cervical vertebræ by this method. Its usefulness is greatly enhanced by the administration of iodide of potassium, at first in moderate and later in very large doses, and pushed to the extreme and continued for several weeks. The value of the jacket is not confined to recent cases alone, while it is a most useful adjuvant for immobilization of the spine after laminectomy.

L. S. Pilcher, in discussing Dennis's paper, referred to the greater mobility of the spine-fragments following laminectomy. In a number of cases of this kind, which had come under his own observation in past years, there had been evidently much greater



Posterior view.

Anterior view.

PATIENT WITH FRACTURE OF SPINE IN THE CERVICAL REGION, SHOWING APPLICATION OF JACKET. (DENNIS.)

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mobility after the laminectomy than before, the cord being thus constantly exposed to injury. This fact had been so strongly impressed upon his mind as to constitute a controlling reason for desisting from such operative procedure, except in the presence of well-defined indications. Abbe⁹⁶_{Mar., '95} believed that treatment by the plaster-of-Paris jacket and extension should be given a general trial. He regarded extension as an important part of the procedure, since it in all probability acted in some degree toward reducing the deformity, relieving pressure, and restoring the spine to its normal curve. Abbe, however, said that ordinarily, when the bodies of the vertebræ were intact, laminectomy would not impair the strength of the spine. He had performed the operation a

number of times and had never been able to recognize the slightest difference in the suppleness of the spine.

Abscess.

In a comparative study of the treatment of spinal abscesses Albert Carless, of London,¹⁵_{Sept., '95} reviews the various methods employed at the present time,—viz., (1) tapping, with simple lavage; (2) removal of the pyogenic membrane, as well as evacuation of the pus; (3) the injection of an antiseptic into the sac after the latter has been emptied of pus, whether the walls are denuded of pyogenic membrane or not. This is, perhaps, the most recent and certainly the most valuable plan that has been suggested. Iodoform is the agent mainly employed, and, though the importance of its being sterile is not usually emphasized, Carless believes it advisable to wash the powder in a 1 in 20 carbolic solution before using it.

E. Wieland, of Basel,³⁰¹_{July, '95} states that the method has been used in the Children's Hospital of that city for some years with excellent results. Spinal abscesses are aspirated in order to remove the pus and then thoroughly washed out with a 4-per-cent. solution of boric acid; 20, 30, or even 50 cubic centimetres (5, 8, or 12 fluidrachms) of a 10-per-cent. glycerin emulsion are then introduced and left in the cavity. Should the abscess refill, the same process must be repeated; the fluid evacuated usually contains a considerable amount of iodine and is thinner and less purulent-looking than the original pus. Sometimes the wound gives way and a sinus remains, which must be treated on ordinary antiseptic principles, although the cure may occasionally be hastened by dissecting around the orifice of the sinus, washing and scraping out the discharging track, and then suturing closely the external wound. Wieland lays a good deal of stress on the importance of compressing the parts with a flannel bandage, which must be re-adjusted daily so as, if possible, to occlude the abscess-cavity. Cheyne²⁰⁵²_{v.1} points out that it is not advisable to attempt much scraping, since thereby septic mischief may be disseminated and harm rather than good result.

Pickering Pick, of London,¹⁰⁷⁷_{Aug. 14, '95} states that aspiration may be used with advantage in dealing with abscesses which are much loculated, the chief loculi being emptied by this means while the main cavity is dealt with otherwise.

Paraplegia.

From the study of six cases of paraplegia due to spinal caries Alfred Parkin¹⁰¹_{Jan., '96} concludes that extension and counter-extension

of the spine, however carefully applied, has little or no effect on cases of paraplegia. As a rule, laminectomy has an immediate effect when the paralysis is due to caries of the spine, and most cases so treated recover entirely from the paralytic symptoms. If the tuberculous focus can be eradicated from the vertebræ there is every prospect of the result being permanent; if not, relapses may take place or further tuberculous troubles may arise, as in tuberculous disease elsewhere. He asserts that it is possible, by means of laminectomy, to considerably improve cases of severe deformity from spinal disease, while advanced cases, in which it is probable that a caseous mass exists, may be greatly benefited by laminectomy and the direct treatment of the diseased focus. The operation itself is not a difficult one unless there is grave respiratory trouble and does not interfere with the future stability or mobility of the spinal column, though the disease itself for which such operation is performed may do so.

Cases in which laminectomy for this condition was followed by satisfactory results are recorded by Noble Smith, of London²_{Dec. 1, '94}; Vincent, of Lyons,²¹¹_{Sept. 15, '95} and Victor Horsley, of London.²²_{Apr. 10, '95}

Ménard, of Paris,⁸⁵³_{Mar., '95} in the course of a laminectomy for the relief of the paraplegia of spinal caries, observed that he did not obtain any result except in cases where there was a tuberculous abscess opened during the operation, and deduced the conclusion that it is possible that the success was not due to the opening of the spinal canal, but to the accidental opening and drainage of the tubercular abscess. The confirmation of this hypothesis was seen in the recovery of two patients upon whom he practiced the direct opening and drainage of the abscess-cavity without the opening of the spinal canal. One was the case upon which an unsuccessful laminectomy had been performed previously and the other had never been operated upon. In both cases the paraplegia commenced to disappear immediately after drainage had been established. The author reports three other cases in which the paraplegia had existed for some time and which was relieved speedily by this drainage. The immediate results in these three cases are of great interest. A few hours after the opening of the tuberculous abscess the patients felt a sensation of greater freedom in the lower extremities. The voluntary movements began to increase in intensity from the first day. They developed progressively until, at the end of the tenth, fifteenth, and twenty-fifth days, they were able to stand and walking began to be possible. Other phenomena began gradually to assume the normal condition. The operation is performed as follows: An incision two to three inches in length is made in a transverse direction, exposing the

portion of the spinal column corresponding to the angle of curvature. The transverse process of one of the vertebra is then removed subperiosteally from its attachment to the rib and torn away as deeply as possible at its vertebral attachment. The grooved director is then pushed beneath the periosteum, and the lateral aspect of the vertebra explored and the abscess discovered. Pus usually shows itself as soon as the lateral process is removed, the grooved director only serving to enlarge the opening. The permanence of the results obtained is attested by the absence of the paraplegia fourteen, eleven, and ten months after the operation in the first three cases and the persistent improvement in all cases operated upon.

Gray²_{Apr. 13, '95} details the case of a boy, aged 12 years, who, six or seven months after a fall, was observed to be growing crooked. A felt jacket was worn for a time, but had to be abandoned on account of the discomfort produced by it. In July, 1893, there was complete paraplegia, which was said to have developed gradually. Sensation was also lost in the legs. On examination a distinct postero-lateral curvature involving the fourth, fifth, and sixth dorsal vertebræ was seen. The reflexes, both superficial and deep, were all present. The knee-jerk was exaggerated, as was also ankle-clonus. There were no rectal or bladder symptoms. As all active disease in the spine had subsided, it was decided to remove the arches of the vertebræ involved, which was done April 4, 1894. At the end of six weeks a plaster-of-Paris jacket was applied and the boy allowed to move about by the aid of crutches. On the 16th of November he was able to walk without any assistance whatever.

According to H. C. Wyman, of Detroit,¹_{Oct. 6, '94} the impairment of bowels and bladder incident to paraplegia makes the after-treatment and care of laminectomy cases particularly important. Bed-sores are apt to occur if the patient is not lifted from his bed several times daily; and for this purpose a sufficient number of nurses is the most satisfactory means that can be employed. The dribbling urine is apt to get into the bedding and infect the wound, if not carefully removed. The author uses a sterilized catheter, lubricated with freshly-sterilized oil, three times a day, and a rubber or glass urinal in the intervals. A diet containing well-cooked Indian meal helps to keep the bowels in a proper state of solvency.

Tumors.

Kümmell, of Hamburg,^{336 451}_{No. 27, '95; Oct.} relates an interesting case in which a tumor was diagnosed and removed from the spinal canal

of a patient, aged 47, with almost entire recovery and relief from pain. He had complained, in 1889, of weakness and pain in the limbs, which gradually increased and which resisted all treatment. In May, 1893, a tumor was discovered on the inner surface of the rectum and successfully removed, the patient recovering entirely. This tumor was found to be a sarcoma. The following year the patient again had gradually-increasing pain and weakness in the lower extremities, with localized pain beneath the shoulder-blades, followed by a paralysis, so that on the 6th of November of that year he was unable to move at all. The area of anæsthesia extended to the third thoracic vertebra on the left side and to the seventh on the right, with an area of hyperæsthesia extending above. The situation of these areas and the history of their development, together with the history of previous malignant growth, made the diagnosis of a tumor in the spinal canal at about the third thoracic vertebra on the left side nearly certain, although there were no external evidences of its presence. The patient's condition made operation necessary, and an incision over the third, fourth, and fifth vertebræ disclosed an external roughening as an evidence of the presence of disease. The removal of the spinous processes and arches disclosed a crumbling, bleeding tumor within the canal, but not a part of the spinal cord, although the latter was compressed to a marked extent, in sharp contrast to the normal size above and below the tumor. The compressed portion was dark red and markedly cyanotic. The tumor had no connection with the dura, from which it was easily separated, although a portion of the vertebræ had undergone pressure-necrosis. The operation of removal of the tumor and cleansing of the wound occupied a little over half an hour. It is of interest to note the change that took place in the compressed portion of the cord during the short time it was under observation; it rapidly regained its normal size, lost the bluish-rose color, and differed only from the normal part of the cord above and below by the inflammatory color remaining in it. The patient stood the operation well; the pain in the wound was very slight, and the following day reflex convulsions manifested themselves in the lower extremities. There was, however, no marked decrease in the paralytic symptoms for the next fourteen days, although there was a gradual increase in the severity of the convulsions. The great toes of the right and then the left foot were moved on the sixteenth day after the operation, and the other toes on the succeeding days. A week then elapsed, when the patient moved first the right and then the left foot; other groups of muscles gradually regained their power, until, a month and a half after operation,

the patient could raise his legs up from the bed. Sensibility improved gradually with the return of motion, and two months after operation the patient could stand, and later acquired the use of his limbs so that he could walk for a length of time and climb up and down stairs with the aid of a cane. The only remaining effects of the paralysis are incontinence of urine and difficulty in defecation. The tumor was found to be a sarcoma about the size of an apple. The prognosis is, therefore, unfavorable so far as return of the disease in some other situation is concerned; but the relief of the symptoms and paralysis make the operation justifiable and of great value to the patient.

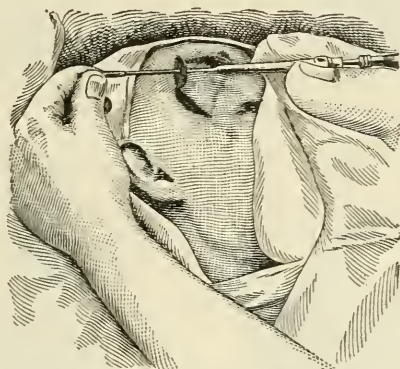
Péan, of Paris, ¹⁴_{Oct. 25, '94} publishes the third case of primary enchondroma of the spine known to him in the literature and the first met with in the cervical region. Its complete extirpation necessitated the partial excision of several vertebræ and extensive opening of the spinal canal. Recurrence took place within a year, but the patient refused a second operation.

NERVES.

Neuralgia.

Putnam ⁹⁹_{Apr. 25, '95} states that the pathology of neuralgia still seems to be obscure. A few interesting anatomical observations have been published. One of the first of these was by de Schweinitz, of Philadelphia, who found a marked degeneration of the nerve-fibres, while Dana, of New York, published notes of several cases in which he had found a marked arterio-sclerosis of the blood-vessels and not much degeneration of the nerve-fibres. Since then there have been a limited number of others. He himself examined, some years ago, the nerves from five patients operated on by Richardson, Cabot, Warren, and Mixter. In some of them there was very marked degeneration; in others well-marked arterial change, some arteries being entirely plugged. In others, again, there was no great change to be seen; so that even in cases where neuritis is present it cannot positively be said that it is the real cause of the neuralgia. His own impression is that there are two elements present: one, peripheral irritation of some sort, and physiological disturbance of the nervous centre which gives the neuralgia its peculiar character; for example, the neuralgia of the lower branches of the fifth is usually quite different from that of the supra-orbital branch. Supposing neuritis to be present and to be the main cause of the trouble, so that the nerve deserves to be treated as a foreign body and removed, the question

arises whether any idea can be formed as to how far the neuritis has progressed. The history of parallel cases of neuralgia of the limbs after amputation is important in this connection. Abbe, of New York, has in several cases made section of the posterior nerve-roots of the spinal canal above the ganglion in which they primarily arise, and, although there was relief for a time, the pain returned, indicating that some change had taken place still farther up. In cases of these facial neuralgias of the fifth pair where the nerve is so short that the neuritis might be expected to reach the Gasserian ganglion very early, the question would be whether it would go beyond it. There is no reason to think it might not do so. It would certainly seem as if removal of the trophic ganglion of the nerve would afford an additional security, although this may not be proven.



FORMATION OF TEMPORAL FLAP. (KRAUSE.)

Berliner med. Wochenschrift.

D'Antona ⁹²¹_{Nov. 15, '94} observed, in a case in which he had performed a modification of Rose's method, distinct changes in the part of the ganglion removed,—namely, diminution of the ganglion-cells in number, and also deformity in shape, the connective-tissue element being increased.

F. Spallita ⁴⁰⁹_{v. 22, p. 69} removed the Gasserian ganglion from four dogs, and found that twenty-four or forty-eight hours later there were alterations of the cornea and conjunctiva. One of the animals, recovered and sacrificed thirty-two days later, showed symptoms of ulcerating neuroparalytic keratitis; in another the eye was destroyed in seven days by panophthalmitis. These accidents, however, did not occur if the superior cervical ganglion were removed before the Gasserian. In this case complete anæsthesia of the trigeminal region occurred, but no alteration of the right eye; the conjunctiva was almost normal, the cornea smooth and bril-

liant, the contracted pupil dilating in obscurity. If alterations of the conjunctiva and cornea did occur they were soon restored. The author found, also, that the lesions produced by section of the trigeminus were due to strong vascular constriction.

Fedor Krause, of Altona, ⁴June 3, '95; ³⁴June 18, '95 has for the past few

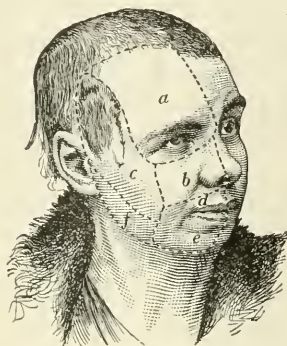


FIG. 1.

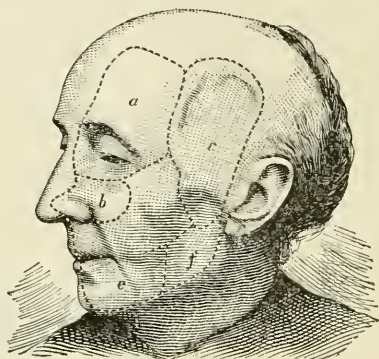


FIG. 2.

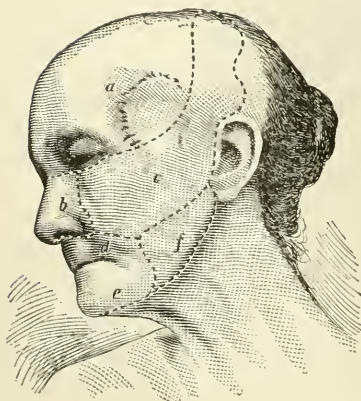


FIG. 3.

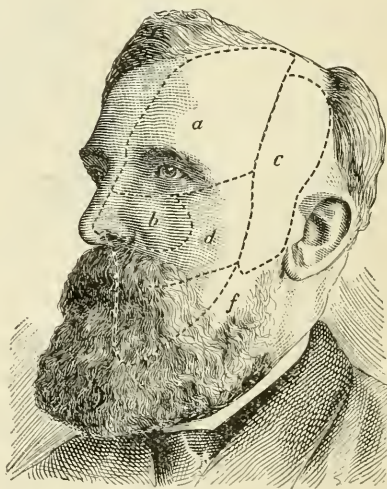


FIG. 4.

CHANGES IN SENSIBILITY AFTER EXTIRPATION OF THE GASSERIAN GANGLION. (KRAUSE.)

Münchener med. Wochenschrift.

years recommended and practiced removal of the Gasserian ganglion in obstinate cases of facial neuralgia. In the operation, as performed by him, a pear-shaped flap of bone, together with the coverings of skin and muscle, the base of which is seated just above the zygomatic arch, is formed in the temporal region, the bone being divided by a circular saw, worked either by an electro-

motor or by a dental engine, as shown on page 63. This flap, still remaining attached at its base, is turned down, and the exposed dura mater is carefully detached from the bone of the middle cranial fossa and elevated, together with the brain, by a broad retractor. Next the middle meningeal artery is ligatured and the dura mater carefully detached from the bone. In this manner the Gasserian ganglion is exposed and removed. It may be adherent to the meninges, and, if great care is not taken, they may be injured or the cavernous sinus opened. If the latter happen the hæmorrhage must be arrested by packing with gauze, and further operation desisted from. He claims that removal of the ganglion is preferable to excision of the three parts of the nerves, that it is not more difficult or dangerous, and that it is more efficacious. In his opinion, Rose's method does not allow sufficient room for the performance of the necessary procedures, it makes arrest of hæmorrhage difficult, while the Eustachian tube may be ruptured and cause infectious meningitis. One of Krause's patients, a woman aged 66, had complete paralysis (sensory) on the affected side of the face after the operation. There was no keratitis, although the cornea was insensible. The cure of the neuralgia was complete, and two years after the performance of the operation there had been no recurrence. A comparison of the cases operated on by Rose's method and those operated on by the method of Krause and Frank Hartley shows a mortality of 18 per cent. in the former and 9.8 in the latter. Curious functional disturbances (as shown in the illustrations) are described as following the operation. Sometimes there is difficulty in opening the mouth, apparently determined by contraction taking place in the muscles of mastication.

FIG. 1.—Mrs. W., 36 years old. 1888, N. infraorbitalis resected. November 29, 1894, extirpation of the ganglion Gasseri. Condition eighteen days after the operation as follows :—

Region.	Sensibility to Touch.	Sensibility to Pain.	Sensibility to Heat.	Sensibility to Cold.
<i>a</i>	Diminished.	Preserved.	Very slightly diminished.	Preserved.
<i>b</i>	Preserved.	Preserved.	Slightly diminished.	Preserved.
<i>c</i>	Greatly diminished in front of ear; otherwise retained.	Preserved.	Greatly diminished.	Preserved.
<i>d</i>	Preserved.	Preserved.	Slightly diminished.	Preserved.
<i>e</i>	Preserved.	Preserved.	Greatly diminished.	Preserved.
<i>f</i>	Diminished.	Diminished.	Greatly diminished.	Diminished.

FIG. 2.—Mrs. F., 70 years old. In 1892 first and second branches were removed as far as the base of the skull. September 19, 1894, ganglion extirpated. 1 refers to the condition eighteen days after the operation and 2 to six months after operation.

Region.	Sensibility to Touch.	Sensibility to Pain.	Sensibility to Heat.	Sensibility to Cold.
<i>a</i>	1. Retained. 2. Diminished.	1. Retained in outer half. 2. Diminished in outer half.	1. Diminished. 2. Diminished.	1. Retained in outer half. 2. Diminished.
<i>b</i>	1, 2. Retained.	1, 2. Retained.	1, 2. Retained.	1, 2. Retained.
<i>c</i>	1. Retained. 2. Present to a slight degree.	1, 2. Retained.	1, 2. Present.	1, 2. Present.
<i>d</i>	1. Retained. 2. Diminished.	1, 2. Retained.	1, 2. Retained.	1, 2. Retained.
<i>e</i>	1. Retained. 2. Diminished.	1, 2. Retained.	1. Retained. 2. Diminished.	1, 2. Retained.
<i>f</i>	1, 2. Slightly diminished.	1, 2. Slightly diminished.	1, 2. Diminished.	1, 2. Diminished.

FIG. 3.—Mrs. R., 68 years old. Third branch resected in 1880 and 1883. Ganglion extirpated January 31, 1893. Condition four weeks after the operation.

Region.	Sensibility to Touch.	Sensibility to Pain.	Sensibility to Heat.	Sensibility to Cold.
<i>a</i>	Diminished.	Greatly diminished.	Retained.	Retained.
<i>b</i>	Retained.	Retained.	Retained.	Retained.
<i>c</i>	Retained, but localization poor.	Slightly diminished.	Weak.	Weak.
<i>d</i>	Greatly diminished.	Very greatly diminished.	Retained.	Retained.
<i>e</i>	Diminished.	Diminished.	Retained.	Retained.
<i>f</i>	Present, but localization poor.	Diminished, but very slightly.	Weak.	Weak.

FIG. 4.—Mr. B., 55 years old. In 1882 N. infraorbitalis and in 1884 N. supraorbitalis resected. May 30, 1893, ganglion extirpated. Condition observed by Hitzig nearly two years after the last operation.

At the time of the examination, three weeks after the operation, the boundaries of the anæsthetic zones were about the same as those given in Fig. 3.

Region.	Sensibility to Touch.	Sensibility to Pain.	Sensibility to Heat.	Sensibility to Cold.
<i>a</i>	Retained.	Greatly diminished in the main, but retained in the lower portions.	Pretty generally retained.	Pretty generally retained.
<i>b</i>	Retained.	Retained.	Retained.	Retained.
<i>c</i>	Pretty generally retained.	Pretty generally retained.	Pretty generally retained.	Pretty generally retained.
<i>d</i>	Pretty generally retained.	Pretty generally retained.	Pretty generally retained.	Pretty generally retained.
<i>e</i>	Retained.	Pretty generally retained.	Pretty generally retained.	Pretty generally retained.
<i>f</i>	Present.	Present.	Present.	Present.

According to le Dentu, of Paris, ⁶⁷_{Aug. 30, '95} the extirpation of the Gasserian ganglion is indicated in cases of neuralgia in which all the branches of the trigeminus are involved. In such cases, however, intra-cranial lesions are also present. When there are irradiations of pain, resection of the nerve at the most painful points will relieve the irradiation.

In a report of additional cases of intra-cranial neurectomy, Louis McLane Tiffany, of Baltimore, ⁹⁶_{May, '95} shows by diagrams that the face-anæsthesia varies greatly in these cases, it not being so extensive as to cover the territory supplied by the fifth nerve,—its divided divisions. This is probably due to the presence of sensory nerves, which pass from the neck to the face. The persistence of the anæsthesia is, of course, to be considered. This probably diminishes, both in extent and intensity, although he is not at present prepared to give the exact statistics in regard to his patients. Distinct from the anæsthesia, however, is to be considered the pain, because face-anæsthesia and pain do not necessarily go together. In a certain number of cases there is, he believes, no doubt about the fact that face-sensation may remain or be present soon after the division of the nerve, yet pain be altogether absent.

In reporting a case in which he performed Rose's operation for trigeminal neuralgia, Dandridge, of Boston, ⁹⁹_{Apr. 25, '95} gives a review of the results obtained by others. In his own patient the condition at the time of report showed marked atrophy of the muscles of mastication on the side operated upon, and depression in the region of the zygoma produced considerable deformity (the zygoma was not sutured back in position, but was removed). Sensation was nowhere completely lost, but was most deficient below the infra-orbital foramen and over the spot on the forehead which was the seat of greatest pain. The sense of hearing was almost lost in the right ear. The sense of taste was greatly impaired on the right side. Rose reported that the results of his seven cases had been most gratifying. In one instance—that of a highly-neurotic woman—there was return of pain. Sometimes he has noticed a little stiffness in the lower jaw, easily tolerated in comparison with the terrible pain from which relief has been obtained. Several years have elapsed since the operation; so that this report carries some weight. Parks reports cases operated on in 1892 as still in satisfactory condition. Andrews has had two relapses after cures for a long time,—in one case for three years. Parkhill reports recurrence after complete relief for two years. The Hartley operation was then performed, the patient dying from exhaustion. This is the only case in which Hartley's operation has been performed

after Rose's method. Eskridge reports one case without recurrence two years after operation. Fowler's statistics show that, in 26 cases in which the infra-orbital nerve was removed together with Meckel's ganglion, there was complete relief for over three years in 3 cases, for over two years in 6 cases, and over one year in 9 cases. In 26 cases of neurectomy of the infra-orbital without removal of Meckel's ganglion there was immunity for three years in 5 cases, over two years in 3 cases, and over one year in 7 cases. Deafness, of course, can readily be produced by a half-inch trephine, as it passes in immediate contiguity to the ridge of bone which forms the inner boundary both of the foramen ovale and spinosum. In 23 collected cases of Rose's operation there were 3 deaths; 26 cases of Hartley's operation gave 5 deaths.

The author holds that the results so far obtained in the intracranial operations do not justify the abandonment of the more superficial neurectomies in persistent neuralgia, but certainly justify the expectation that they will afford great, and possibly permanent, relief when recurrence takes place,—a relief so great as to fully justify the danger they involve.

In the discussion of Dandridge's paper, Mixer, who has performed the operation of dividing the terminal branches in fifteen cases of division of the second and third divisions at the base of the skull, three being only divisions of the third division, regarded it as interesting that, in a certain number of those cases, the pain has returned. During the first few years in which he removed the nerve at the foramen ovale and rotundum he began to think that the patients were permanently cured; and, although Rose and others published their operations on the Gasserian ganglion, he questioned the advisability of attacking the ganglion when the operation could be done so much easier at the foramen. Within six months, however, he had had three patients come back with severe neuralgia, in spite of this comparatively radical operation, thus bringing up the question as to whether, in cases of beginning neuralgia which promises to be of epileptiform variety, where it may come on for a time and then disappear under treatment, it is best to go as far as possible and take out the ganglion, or do the more superficial neurectomies; also, whether time will show that removal of the Gasserian ganglion is a permanent cure. In a number of cases several years have elapsed since the nerves were divided at the foramina, and in certain cases the pain has returned; in these, operations had been performed before, and more superficial neurectomies had been resorted to.

There are one or two points in regard to dividing the nerves at the base of the skull and not sawing through the zygoma that

are worthy of attention. At first the speaker had always drilled and wired the zygoma, but later he has seldom taken the pains even to stitch up the fascia over the bone, simply letting it drop into place. The temporal muscle atrophies, and by far the greatest deformity is depression caused by atrophy of the temporal; and the zygoma, if allowed to take whatever position it likes in the wound, will cause very little deformity.

Another point is the question of deafness after these operations. This has occurred several times. In one case there was a large ecchymosis about the eye where he had gone in over the second division through that incision, and in two or three other cases an ecchymosis in the membrana tympani, and between the layers of the latter a considerable quantity of blood. Deafness and noises in the ears persisted a long time.

Richardson said that he had in his operations gradually approached the Gasserian ganglion, beginning first with the infra-orbital, supra-orbital, and finally getting at the ganglion itself. It seemed to him that every method of treatment should be exhausted before taking out the ganglion; for in many cases, by so simple an operation as evulsion of the mental, infra- or supra-orbital portions, devoid of danger, permanent immunity may be secured. Naturally, the number of cases cured by so simple an operation is not many, but the deeper operation may be repeated in the sphenomaxillary fossa. This, although one of the most difficult operations in surgery, does insure long immunity.

Arpad G. Gerster, of New York, ⁵⁹_{June 29, '95} performed Hartley's operation on a man who had previously undergone Carnochan's operation twice, with only temporary relief. In liberating the infra-maxillary branch of the nerve, suddenly profuse venous hæmorrhage was encountered. This was controlled by packing, and three days later the operation was completed. Death followed one week later, and a focus of softening was found, at the deepest portion of the wound-cavity, the size of an English walnut, involving the cortex. The definition of this focus from the healthy brain was very sharp.

Chalot, of Toulouse, stated that he had recently removed the Gasserian ganglion from a man who had already undergone two operations on the nerves and trigeminal ganglion without result. He had readily located the Gasserian ganglion, but had found its extirpation dangerous, owing to its proximity to the cavernous sinus, which, at the moment of removal, the tenotome had penetrated, causing abundant hæmorrhage. He had found it necessary to leave a tampon in the wound. The patient died on the following day.

Another case, fatal four days after operation, is recorded by Caponotto.⁹²¹ The post-mortem examination showed septic inflammation of the soft parts about the wound, meningitis, laceration of the Eustachian tube, and complete destruction of the Gasserian ganglion. A cholesteatoma the size of a nut was found just where the root of the trigeminus enters the pons; this evidently was the cause of the neuralgia. As to the technique of the operation, Caponotto opened up the foramen ovale with a chisel and mallet instead of a trephine, and used a sharp spoon instead of hooks in the removal of the ganglion. The foramen ovale was made the centre in opening the skull. At the time of operation Caponotto was ignorant of Rose's caution with regard to the danger of lacerating the Eustachian tube and the way to avoid it.

E. Doyen, of Reims,¹⁰⁴³ states that, while Krause's method is, perhaps, preferable when the patient is stout, his own method seems to him more certain in thin patients, in whom the zygomatic fossa is more easily accessible.

Beck,⁷⁶¹ for neuralgia of the second and third branches of the trigeminus, recommends intra-cranial resection, as the extensive operations necessary to remove these branches without opening the skull leave extensive scars about the nerve-stumps and predispose to recurrence. The first branch, however, can probably be dealt with by external operations. In three cases of removal of the Gasserian ganglion by osteoplastic flaps described by him severe hæmorrhage occurred in two, due to the fact that the middle meningeal artery ran in bony canals instead of shallow grooves, rendering it necessary to tampon the wound to control the hæmorrhage. In one of these cases a secondary hæmorrhage occurred, and in the other three attempts had to be made before the ganglion could be removed, with the result of slight infection and some encephalitis; but both cases finally recovered. He gives a list of eighteen cases so operated and of twenty-three operated upon by ordinary trephining (Rose's operation), the mortality being about the same for both methods.

Cases of intra-cranial neurectomy are recorded by R. W. Stewart, of Philadelphia,⁹ and Robert Abbe, of New York,⁵⁹ who states that, in a number of instances of inveterate neuralgia of the inferior dental, he has taken out an inch or an inch and a half of this nerve and given permanent relief, but some cases had returned. The same is true of the eight or nine cases in which he had performed Carnochan's operation for neuralgia of the middle branch, dividing the nerve back of Meckel's ganglion; some of the patients had been permanently relieved, others had returned. Sulzer's operation is somewhat more difficult than

Carnochan's, leaves more of a scar, and is not as satisfactory as the intra-cranial operation. He has done the Sulzer operation with satisfaction in three cases, but in two there was return of the pain. The Hartley operation was the final one, and, although it was more recent than the others, it bade well to give permanent relief. Out of fifty or sixty reported cases there had been a few deaths from hæmorrhage or cerebral abscess, but Abbe thinks that, with due care, these accidents might have been avoided.

J. G. Clark, of Olean, New York, ¹_{Feb. 16, Apr. 30, '95} reports a case of severe neuralgia of the first and second divisions of the fifth nerve, on the left side, in which teeth had been extracted vainly and no relief was obtained except by morphia. Clark operated, locating the infra-orbital and supra-orbital foramina and dividing the nerves. He then pushed the small, round tip of a Paquelin cautery upward and backward, through the infra-orbital foramen, half an inch into the canal, destroying the nerve. Since the operation (a year ago) the patient has been perfectly free from pain.

Tansini, of Palermo, ⁵⁸⁹_{Nov. 12, '94} describes a case, in a man of 67 years, in whom every attempt at mastication or speech brought on a paroxysm. Stretching of the facial nerve by Hueter's method produced only temporary relief, and Tansini then performed neurectomy of the branches of the trigeminal at their points of issue, followed by the application of the actual cautery to the central stump. The operation was completely successful. The same result was obtained in two other cases of a similar nature. MacGillivray, of Edinburgh, ³⁶_{Apr., '95} operated on a girl of 19 years for severe facial neuralgia, reaching the ganglion by turning up the left cheek and cutting away the whole front of the antrum. The cure of the neuralgia was thus effected,—at least, temporarily; no external incision was required and no deformity resulted.

Aimé Guinard, of Paris, ¹⁴_{Nov. 20, '95} has practiced resection of the infra-orbital nerve and Meckel's ganglion three times for the cure of obstinate facial neuralgia. He is opposed to removal of the Gasserian ganglion as being too serious an operation and attended with grave after-effects, and advises, in all cases in which the neuralgia begins in the infra-orbital region, resection of this nerve and of Meckel's ganglion; and this even when the pain has extended to the other branches of the trigeminal nerve. Resection of the Gasserian ganglion is, in his opinion, only warranted when extra-cranial extirpation of the trigeminal branches has been tried and failed. In his experience resection of the infra-orbital nerve and its ganglion may bring about a cure of the painful symptoms, even when at some distance from the region operated on.

Dubois, of Cambrai, ¹⁴_{Nov. 20, '95} reported three cases successfully

treated by extra-cranial neurectomy, and indorsed Guinard's recommendation to leave extirpation of the Gasserian ganglion as a last resort. In his operations, instead of drawing the infra-orbital nerve forward, as is usually done, he drew it entire into the sphenomaxillary fossa, where it was very easy to recognize and to cut it. The usual severe hæmorrhage he avoided by digital compression of the carotid, thus enabling him to see the superior maxillary at the fundus of the fossa.

Sorge⁵³⁷_{v.7,p.263} has performed neurectomy twice,—once with complete success and in the other without result. In the first case section of the supra-orbital had previously been performed, and the author again resected this nerve, together with the infra-orbital, the former by Letiévant's and the latter by Guérin's method. The cure was permanent. The pain had always been in these two nerves, and was purely of peripheral origin.

A. C. Bernays, of St. Louis,¹⁰⁹_{Feb., '95} performed a successful neurectomy of the second and third branches of the fifth nerve for tic douloureux of two years' standing.

Adenot³_{Oct.10,'95} advocates tearing out of the nerve. Section being made as high up as possible, the peripheral end is seized with a pair of forceps, around which it is wound until as much is removed as possible. Eight or ten centimetres can thus be taken away. Good results have been obtained by this method of treatment by Mollière, Tripier, and Gangolphe. Chipault also speaks favorably of the method, having had a complete success with it in a case of neuralgia of the forearm which had previously resisted section of the ulnar nerve.

Karewski⁶⁹_{No.52,'94} believes that tearing out the peripheral end of the trigeminal nerve, as practiced by Thiersch and Israel, will eventually replace other and more severe measures in cases of rebellious neuralgia. He has tried the operation several times, succeeding in tearing out the diseased nerve, together with its finest ramifications. Cure was permanent in all but one case, in which there was sclerosis of the nerve-centres.

Chipault and Demoulin, of Paris,⁴⁵²_{No.2,'95} record the case of a healthy man, 34 years old, who for four years had suffered from continual pain in the little finger and inner side of the hand, with temporary exacerbations involving the inner side of the forearm. He underwent all possible methods of treatment, including two operations on the ulnar nerve,—stretching of the dorsal cutaneous branch and section in the epitrochlear furrow,—without any relief. Careful examination showed that the diagnosis of ulnar neuralgia, hitherto made, was incorrect and that the case was really one of neuralgia of the seventh right cervical root. The

zone of hyperæsthesia comprised the inner surface of the ring finger, the inner part of the hand to a corresponding extent, two areas on the arm and forearm a centimetre and a half in width,—one anterior, passing within the tendon of the biceps; the other posterior, passing along the inner border of the olecranon. This exactly corresponded to the domain of the eighth cervical root. The authors decided to open the spine, and, accordingly, resected the first dorsal and the eighth and ninth cervical arches, finding nothing abnormal either in the canal or the intervertebral foramina. They then incised the dura mater and exposed the three posterior corresponding roots, resecting, between the medulla and the ganglion, not only the eighth cervical, but also the upper and lower adjoining roots, in conformity with the physiological assertion that resection of a single root is not sufficient to produce anæsthesia in the territory of that root. Two hours after operation the patient was examined and it was found that the zones of hyperæsthesia and spontaneous pains had disappeared. The patient was able to use his hand in eating and writing, which he had not done before on account of the great pain. Four months later recovery still persisted and there were no trophic troubles. The authors call attention to a number of interesting physiological observations made during and after operation; among these may be noted the fact that electrization of the posterior roots induced manifest vascular constriction throughout their territory; also, that section of the three roots caused but slight hyperæsthesia in the member, lasting only twenty-four hours.

Rafin³_{Oct.10,'94; Nov.24} reports a case of neuralgia of the inferior dental nerve in a man, aged 52, who in his infancy had been wounded on the right side of the chin, over the mental foramen. He performed resection of the nerve on the right side from the mental foramen to the masseter muscle, and stretched its central end. The patient ceased to suffer, and from the date of the operation to that of the report—an interval of eight months—had remained quite free from pain. Two important points in this case were the occurrence of an injury over the lower jaw forty years before the first attack of neuralgia in this region, and the failure of division of the inferior dental nerve at the dental foramen,—an operation which he had first performed in the case, which, though possessing the advantage of leaving no visible cicatrix, is one that is really “done in the dark,” and is very likely to be followed by regeneration of the divided nerve.

Resection of the alveolar process in neuralgia of the dental nerves is discussed by V. Faucon, of Lille,²²⁰_{Sept.7,'95} who performed this operation in one case with satisfactory results at the time of

report, some five months later. The patient feels some shooting pain in the bone when obliged to work for any length of time with the head down. The alveolar border is painless; tactile sensibility is abolished in the lower lip and chin, while it is preserved in the maxillary and masseteric regions.

Nerve-Suture.

De Forest Willard, of Philadelphia, ⁹_{Oct. 6, '94} from an analysis of one hundred and seventeen cases of primary and one hundred and thirty cases of secondary suture of nerves, concludes that a sufficient number of operations of this character have been done to show that fears of tetanus are groundless. Errors in reporting successful cases are often due to vicarious or substitutive functions which other nerves of the same part may assume. Failure, in some cases, is evidently due to secondary degeneration of the motor cells in the spinal cord, though the sutured nerve may have united well. Immediate suture of a divided nerve offers a good prognosis of restoration of sensation and motion. Clean end-to-end suture and a careful freeing of the ends for some distance from cicatricial tissue afford the best chance for a restoration of function. The best suture-material is fine chromicized catgut, inserted, by means of a small, round needle, directly through the body and sheath of the nerve. Two sutures crossing at right angles are usually advisable. During the healing process the part should be completely at rest and nerve relaxed, if possible. Good results may be attained by suturing the end of a widely-separated nerve-trunk to the freshened surface of a neighboring nerve or muscle. Secondary suture offers good hope of success, and should be attempted, even years after the accident. Repeated operations may ultimately succeed. In great loss of nerve-substance, grafting a nerve from a freshly-amputated human limb, or from a young animal, gives a better result than the splice-operation of splitting the ends and turning flaps into the gap. Decalcified-bone tubes are so rapidly absorbed as to be of little service in uniting divided nerves. Restoration of function may take place months after the operation, sensation returning first. Though the distal portion of a divided nerve rapidly degenerates, as does an interposed graft, transmission of function is possible and regeneration may take place both as regards sensation and motion.

Henri Maugard ²⁰⁰⁰₉₀ finds the radial nerve especially suitable for the study of regeneration. In cases in which this nerve has been cut by sword or shot wounds, immediate reunion should be attempted in order to hasten regeneration, which generally, but not invariably, takes place, being rendered difficult by the distance

between the severed ends, interposition of fibrous tissue between them, or infection of the wound. The precursory phenomena of regeneration are sensitiveness on pressure and on application of the electric current over the course of the nerve and return of sensation in the zone of the external cutaneous radial nerve. The slow motor regeneration is an habitual symptom, partly dependent on the degree of muscular atrophy.

Glück, of Berlin, ²²_{July 12, '96} performed primary suture of the radial nerve in a boy of 11 years, evidence of reunion appearing in two weeks and complete function returning in a month. The boy died some time later of basilar meningitis, and at the autopsy numerous degenerations were found in the radial nerve, but also some normal fibres which had permitted function.

G. Carl Huber, ²⁰⁵⁴_{Dec., '94} from fifty experiments with the various methods of restoring nerve-substance in peripheral nerves, found that in all experiments the peripheral portion of the divided nerve degenerated, as also one-half centimetre of the distal end of the central stump. Regeneration was obtained after implantation of a nerve-segment, tubular suture, and *suture à distance* with catgut threads. It took place from the central ends, buds being given off from the central axis-cylinders growing toward the periphery. The implanted substance served only as a guide to the down-growing axis. Regeneration took place most rapidly (one hundred and twenty to one hundred and thirty days in dogs) after implantation of a nerve-segment.

Wharton Sinkler, of Philadelphia, ²⁴²_{June, '96} reports a case of injury to the musculo-spiral nerve by a penknife, followed by complete extensor paralysis. Operation was performed three months later by Keen, the nerve being found to be severed and its end bulbous. The bulb was excised and the extremities united by silk sutures. It was treated for seven months by galvanism before the patient was able to fully extend the fingers and hand. This case is interesting as showing that, even after union of the nerve by suture, months of patient work are needed to restore function, and also, as is known, that suture need not be immediate to be effective. In the discussion John K. Mitchell said that he had seen fifty-five cases of section of nerves, some sutured and some not, and had examined the notes of over two hundred and fifty cases of sectioned nerves with more or less complete recovery. He denied the possibility of primary union, believing the cases reported as instances of primary union to have been cases where sensation alone, and not motion, had been studied, the return of sensation having depended upon anastomosis, and not upon reunion of the cut nerve. The most interesting practical point was the great success of secondary

suture, which should be tried even at a much later period. In favorable cases motion will be found to return as soon after secondary as after primary suture. The degeneration which follows every section necessarily occupies many weeks, and these may pass without the nerve being united.

J. Hutchinson, Jr.,¹⁰⁷⁷_{Feb. 6, '95} reports a case of suture of the ulnar nerve, after complete division, about an inch above the pisiform bone, recovery being slow, but complete. Frey, of Vienna,¹⁴_{Dec. 13, '94} describes a similar case.

Caillé,¹⁴_{Jan. 3, '95} sutured the median nerve and four flexor tendons at the wrist, although a phlegmon had followed the injury. The result was good. Tubby,⁶_{May 4, '95} cites a case of contraction following pressure on the median nerve by scar-tissue relieved by operation and suture.

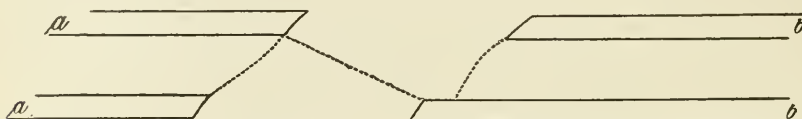
Dallas Pratt,¹⁶_{Sept., '94}; ⁶_{Sept. 22} records a unique case of suture of the sciatic nerve. A delicate-looking lad, aged 16, was employed in a workshop in which there was a large horizontal shaft with a number of pulleys driving machinery. The wound was six or seven inches in length, at right angles to the long axis of the limb, and all the structures at the back of the thigh, including the great sciatic nerve, were divided down to the femur. It gaped to the extent of five inches, and contained a quantity of machine-black, lubricant, and portions of clothing. The patient was anæsthetized and the wound cleansed with 1 in 40 warm carbolic lotion. The divided ends of the great sciatic nerve were found to be in a very lacerated condition; so that it was necessary to remove nearly half an inch of each in order to get a clean and solid service for suture. The ends were approximated by stretching first one and then the other, and they were then united by means of three fine-silk sutures, one into the sheath on each side, and the third through the substance of the nerve in the centre. The muscles were also sutured by means of silk, and the skin was united by harelip-pins. The surfaces were dusted with iodoform, and alembroth gauze was used as a dressing, while the limb was fixed to a splint with the thigh extended and the leg flexed as much as possible. The patient made an excellent recovery, the only complication being a few trophic ulcers on the toes, which healed readily. Within a month of the time of the accident the wound was reduced to a superficial ulcer, and in less than three months the patient was able to walk fairly well, and sensation had returned to all parts of the limb except the dorsum of the foot and toes.

A case of secondary suture of the sciatic nerve is described by Leonard Freeman, of Denver,⁵⁹_{Sept. 29, '94}. At the end of five weeks the patient, a boy of 19 years, could walk well without the use of

crutch or cane, an ulcer on the foot was healed, and the skin of the leg nearly normal. There was some sensation in the foot, although very deficient on the outer border, but sensation in the leg was nearly what it should be. The muscular paralysis, however, had improved little, if any. A year after the operation the patient was again in the hospital, the ulcer on the foot being present, although, as near as could be ascertained, it had healed and broken out several times. On May 24, 1894, the patient was again examined. The leg above the ankle was perfectly normal, the skin being soft and moist and the sensation perfect. The foot, however, was in bad condition,—a large and deep ulcer occupied the posterior surface, while another, smaller ulcer had appeared on the outer edge of the foot near the little toe. In fact, the condition was such that amputation was resorted to in order to rid the patient of his incumbrance.

“Neural infixation” is a term applied by R. Harvey Reed, of Columbus, O., ⁹⁶_{Sept., '95} to the implanting or engrafting of one nerve into the other. While based on the same physiological principles as those which govern the suturing of nerves, he is inclined to the belief that there are other factors which enter into neural infixation that do not necessarily accompany nerve-suturing. He quotes experiments by Howell and Huber, which demonstrated that, whenever a nerve is cut, the peripheral part undergoes degeneration. In this degeneration the axis-cylinder is involved together with the medullary sheath. Such a thing as primary union without degeneration of the axis-cylinder and medullary sheath did not and would not occur, they thought, in either experimental work or surgical practice. These investigators also arrived at the conclusion that there was no regeneration of the peripheral stump unless it was sutured to the central stump, or unless means were provided for the down-growing central axis-cylinder to reach the peripheral stump. This object is fully carried out in the procedure illustrated in the engravings on next page. Reed applied the method in a case of tubercular adenitis involving the axillary glands. There was a large tumor in the left axillary region, nearly the size of a fist, extending to the humeral insertion of the pectoralis major muscle, backward to the serratus magnus and filling the entire axillary space. The patient was operated on December 28, 1894, and the tumor carefully dissected out, exposing the brachial artery, the axillary vein, and the brachial plexus of the nerves. In spite of all the care possible Reed was obliged, during the operation, to cut the circumflex nerve and also the posterior thoracic, which he sutured with catgut. In addition to these he found a large muscular branch which supplied the inner portion

of the arm, which was given off from the posterior cord more than an inch above the circumflex and was entangled in the tumor to such an extent that it was necessary to excise at least two inches of it; the central end of this nerve was infixed into the central end of the circumflex, while the peripheral end was also carefully infixed with catgut suture into the central end of the circumflex. The cavity was packed with iodoform gauze and the dressing completed in the ordinary aseptic manner. The next day there was paralysis of the deltoid muscle, together with anæsthesia and

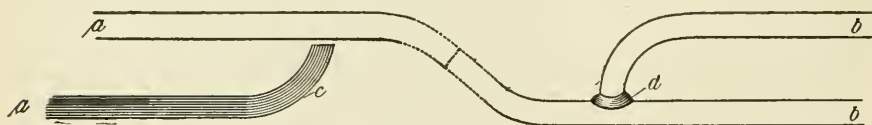


NERVE-GRAFTING, SHOWING NERVES CUT READY FOR IMPLANTATION. (HUBER.)

a a, peripheral ends; *b b*, central ends.

Annals of Surgery.

paralysis of the inner portion of the arm, extending down the ulnar side to the wrist; also anæsthesia over the territory supplied by the posterior thoracic nerve. For more than a week the nerves were plainly visible in the axillary space when the dressings were changed, but were gradually covered by granulation-tissue, and in about two weeks the functions of the severed nerves began to return. The patient was allowed to go home in three weeks and return for dressing, was finally discharged in eight weeks, and in nine weeks returned to his occupation as bartender. He was entirely well at the time of report.



NERVE-GRAFTING BY CROSS-SUTURING. (HUBER.)

a a, peripheral ends; *b b*, central ends; *c*, degenerated nerve; *d*, neuroma.

Annals of Surgery.

The results of division or resection in the neck of the pneumogastric and phrenic nerves have been studied by Roswell Park, of Buffalo, ⁹⁶_{AUG., '95} who found that out of 15 recorded instances in which the pneumogastric was accidentally involved in malignant disease or merely in accidental injuries, 11 died and 2 recovered, while in 2 instances the result was not reported. It is, of course, impossible to separate the causes of death so far as distinctly to state whether death was due to lesion of the nerve-trunk itself or to coincident lesions of other important structures.

The fact, however, remains that out of 13 cases whose results are known, 11 died. Of 50 other cases the result is left in doubt in 2 instances, while of the remaining 48 21 died and 27 recovered, constituting a favorable showing, which to the writer seems a sufficient contradiction for statements found in the older works. Here, too, in the fatal cases, it is impossible to say that in any instance death was due to injury of the nerve; and there have been included under the deaths several cases where the fatal issue was so long postponed as to warrant doubt as to the influence of the nerve-injury. Nevertheless, the preponderance of testimony is in favor of the comparative safety of attacking this nerve when involved in disease and when too much other operating is not necessitated by the condition for which intervention is undertaken.

Tumors.

Morton, of Philadelphia, ¹⁹_{Nov., '94} reports a cure of sarcoma of the sciatic nerve, occurring in a woman 42 years old, which he was able to remove without severing the continuity of the nerve or causing loss of power in the leg. Three months after the operation the patient remained quite well. Although the tumor was a large one, measuring four inches in length and seven in circumference, and had been developing about a year, it had caused little or no discomfort, and no history of sensory or motor disturbance of the distribution of the sciatic could be obtained. To pressure and palpation the growth was almost insensitive.

A fibromyoxoma of the median nerve was removed by Tuffier, of Paris. ⁷_{Dec., '94} It was impossible to suture the ends of the nerve, which were seven centimetres apart. The recovery, however, was perfect.

Thiariar ¹¹⁹³_{May 15, '95} treated a neuroma of the median nerve by crushing it between the teeth of a forceps, with the result of relieving the pain.

A. G. Gerster, of New York, ⁹⁶_{Jan., '95} performed excision and suture in a case of sarcoma of the peroneal nerve. The wound healed kindly, but function was not restored.

Dislocations.

H. R. Wharton, of Philadelphia, ⁵_{Oct., '95} makes a report of 13 cases of dislocation of the ulnar nerve at the elbow, and adds a case under his observation in which Laffer diagnosed the condition, pushed the nerve back into its normal position, placed a compress over it, fixed by adhesive strips, and put the arm in a splint. Wharton saw the case shortly afterward. When the forearm was flexed a cord could be felt distinctly to slip over the

inner condyle and take up a position in front of it, numbness and tingling occurring in the little and ring fingers, but the sensations were much less marked than soon after the injury. Two months later the nerve was found still to slip forward when the arm was flexed, but the boy had been able to resume his work, and only occasionally felt numbness or tingling after the displacement. Accordingly his parents refused to allow him to submit to operative treatment.

THORACIC SURGERY.

BY THE CENTRAL EDITORIAL STAFF.

SUBMITTED FOR COMMENTATION TO

J. McFADDEN GASTON, A.B., M.D.,

ASSOCIATE EDITOR,

ATLANTA, GA.

LUNGS AND DIAPHRAGM.

Empyema.

Bilton Pollard, of London, ²_{Nov. 2, '95} calls attention to the varying character of the contents of different empyemata, and states that those in which the pus contains large masses of lymph or is thick and creamy heal best, while the cases in which the pus is thin or sanious are the least favorable. The fact that the pus is offensive, apart from its other characters, does not much influence the course of healing. The character of the pus depends on the micro-organisms it contains. Pneumococci, staphylococci, and streptococci are found sometimes alone and sometimes mixed in varying proportions. The streptococci are the most virulent, most numerous in thin pus, and indicate an immediate necessity for free drainage. The conditions of rapid and complete healing of the empyema are: negative pressure in the pleura, expansibility of the lung, and the contact of the two layers of the pleura sufficiently long for adhesions to form. Where all these conditions can be induced by simple aspiration, a cure may be effected by that means. More frequently these conditions cannot be established, and aspiration does not then bring about a cure. In cases which do not succeed, harm will have resulted from the delay in using other modes of treatment. In all cases resection of a piece of rib, free incision of the pleura, and continuous drainage are recommended as the best treatment.

[A very interesting and practical phase of the bacteriology of empyema is the relation of cause and effect which micro-organisms bear to the purulent collection. If bacteria are capable of being transmitted from the atmosphere entering the lungs, and thus entering the pleural cavity, they may become an important element

of the etiological factor in empyema. Should it appear, however, that the different forms of micro-organisms—such as pneumococci, staphylococci, and streptococci—are developed in the purulent collection independent of any communication with the atmosphere, there is no ground for claiming any causative influence from this source. That a pyogenic process is generally secondary to serous effusion militates against the supposition that the streptococcus pyogenes had any part in the primary accumulation, and hence could not enter into the etiological factor of empyema. The presence of these micro-organisms, either with or without decomposition of the pus, characterized by bad odor and a sanious consistence, has not thus far led to any material modification of the surgical treatment.—J. McF. G.]

The theory of Weissgerber, in which direct adhesion of the parietal to the visceral pleura takes place without granulation, is probably correct, in the opinion of Pollard. The contact of the two surfaces which must take place before adhesion can occur is brought about as follows: Coughing raises the pressure of the air inside the lung above that on the outside and the lung expands somewhat; the entry of blood into the vessels of the alveoli assists in maintaining the increase of bulk; a dressing over the wound in the chest-wall soon acts as a fairly perfect valve, making the entrance of air in inspiration difficult; the lung continuing to expand under the influence of repeated coughs, comes in contact with the chest-walls, and the two layers of pleura are held together by a kind of sucker-like action till adhesions have formed. This sucker-like action was proved to exist by cases of surgical emphysema, from a wounded lung caused by a broken rib, occurring without pneumothorax.

Moty, of Lille, ¹⁸¹_{June 14, '95} reports a case of purulent pleurisy due to the streptococcus during influenza, and in which empyema was followed by a definite fall of temperature without any complication, in spite of the bad general condition of the patient at the time of operation. Cicatrization was complete within a month without atrophy of the thorax. This success must be partly attributed to the technique of operation. Moty makes the incision as low down and far back as possible, generally in the ninth, and not the sixth, intercostal space. Wounding of the diaphragm, which an incision at this point might involve, is easily avoided by making the incision layer by layer. Then complete and ready evacuation of the pus and false membranes is thus assured. Eight days after the operation the patient spontaneously expelled about 300 to 400 grammes ($9\frac{1}{2}$ to $12\frac{3}{4}$ ounces) of false membranes. The intercostal space opened did not retract like the upper spaces, and, finally,

the issue of the fluid is assured in the lying position,—the most ordinary position of the patient.

A case of empyema is recorded by C. R. Seagrave, of Milnthorpe,²⁶_{Nov., '94} who resected a portion of the eighth rib external to the angle of the scapula, and on opening the pleura drew off exactly 8 pints (4 litres) of muco-purulent fluid.

Desmons, of Lille,²⁰²⁵_{Feb., '96} believes that all cases of purulent pleurisy except those of tuberculosis, where only palliative aspiration is indicated, should be treated by pleurotomy. It has been claimed, it is true, that purulent pleurisy with pneumococci may be cured by simple aspiration, but, as the examination necessary to establish such a diagnosis is not possible for all practitioners, it frequently happens that cases of this kind are obliged to undergo pleurotomy after several aspirations, thus causing a delay which is prejudicial to the patient.

Ch. Bäumlér⁶⁹_{Nov. 37, '88, '94; Feb., '96} formulates the following conclusions in regard to the treatment of empyema in tuberculous patients: 1. Under all conditions a radical operation should be done—the best is a thoracotomy with resection of ribs—if the exploratory puncture show the presence of the bacteria of suppuration in the exudation. 2. If the exudation contain no bacteria of suppuration, but, perhaps, few tubercle bacilli or, indeed, no bacteria of any kind, aspiration may be employed, which will relieve pressure and will allow the lung to expand, if it be expansible. 3. If the case be one of long standing, the compressed lung inexpandible, the condition of the patient passable or good, the empyema stationary, palliative measures are more in the interest of the patient. Of these measures the Playfair-Bülau method of slow aspiration-drainage is the least severe.

A successful case of double thoracotomy is recorded by R. Jasinski,⁵²⁰_{No. 6, '96} the patient being a 7-year-old girl. Claudot²⁴³_{Jan., '96} observed grave fainting spells occurring in the course of treatment after pleurotomy for purulent pleurisy. The case finally ended in complete recovery.

In the course of a paper on pneumotomy for deep thoracic effusions Tuffier, of Paris,¹⁴_{Dec. 15, '96} states that all observers agree as to the elevation of temperature in these cases, but not as to its pathogeny. Michaux attributes it to a traumatic pneumonia, while Tuffier is inclined to agree with Lucas-Championnière that it is due to the absorption of blood. Pleurotomy being decided on in these cases, any adhesions must be taken advantage of to make the incision at their level, without detaching the pleura. The thermo-cautery or, preferably, the bistoury can be used. When there are no adhesions some authors advise direct incision

of the pleural layer. Tuffier, however, believes that this should be tried only as a last resort, since it may give rise to serious accidents, disturbances of respiration resulting from contraction of the lung. In one case of pulmonary gangrene in which he operated retraction of the lung and symptoms of asphyxia followed an incision at the point indicated by medical exploration, and he was obliged at once to suture the lung to the pleural incision and close the cavity of the pleura in order to combat the dangerous symptoms. Another point is that incision of the pleura does not always conduct the operator to the morbid area, as evidenced by many cases. Detachment of the pleura appears to Tuffier to be far preferable, and, by performing it about the incision, it is easy to find adhesions, if any exist, and to learn, in this manner, that the diseased point is not far distant. As regards the gravity of the operation, no immediate accident need be feared; at least, none had been observed in cases of his own and of Quénu. Later accidents depend not upon the operation, but upon the gangrene. Hæmorrhage occurred on the sixth day in one of his cases, and in another when the tampon was removed.

C. G. Cumston, of Boston, ⁹⁹_{v.131, p.502} believes that, in recent favorable cases devoid of all complications, methods such as aspiration, incision, or resection may bring about a cure. In other words, the siphon is capable of bringing about a cure without resection of the ribs and without fistula. Six cases are reported of either chronic or complicated pleurisies which would have been considered as incurable, all of which ended in recovery.

Costal trephining in empyema is recommended by A. Rey, of Algiers, ²¹¹_{June 23, '95} as being simple of performance and harmless, causing only a slight effusion of blood. It should be preferably performed on the eighth, and especially the ninth rib in the widest portion,—that is, posteriorly seven centimetres from the costal angle. The crown of the trephine should measure one centimetre in diameter. If necessary, several openings may be made, either in the same bone or in adjacent ribs. Intra-pleural antisepsis may be freely practiced without danger of the ribs uniting. The thorax is maintained intact, the advantage of the operation over partial resection being that a perfectly circular orifice is made for a self-retaining drain, while the integrity of the thorax facilitates the re-establishment of the respiratory function in the diseased side.

Boisson ²⁴³_{Jan., '95} states that the immediate advantages which he has obtained by wide opening of the thorax and primary costal resection were the following: 1. Great facility of operation in a weak patient whose intercostal spaces became effaced on the slightest contact. 2. Digital exploration of the pleura, permitting

the extraction of coagulated exudate and the rupture of septa which could lead to the stagnation of pus. 3. Abundant aseptic irrigation in all directions by means of the cannula. 4. Free flow of fluid through the drains, which were not compressed by the adjacent ribs. 5. Facility with which the drains can be taken out and cleansed and then put back. 6. Absence of fistula and perfect cicatrization of the skin-wound without adhesions, the osseous arch being reconstituted through the periosteum.

[The employment of irrigation in the cavity of the chest after the removal of purulent collection by incision or otherwise is a precarious measure. Even sterilized hot water has been attended with marked vital depression, amounting in some cases to collapse. Much more disturbance has occurred from medicated injections of antiseptic fluids when septic conditions appeared to indicate correctives. The introduction of iodoform with glycerin by swabbing over the surface or upon gauze tampons within the pleural cavity is not attended with the inconveniences of general irrigation, and proves more effective in correcting septic development. Some surgeons have abandoned entirely the use of irrigation, either plain or medicated, within the thorax, and, with the evidence of grave symptoms following this process of washing out the pleural cavity, it is most prudent to refrain from this procedure in all cases. There is no excuse for irrigation when the purulent discharge has not undergone decomposition, and in this condition other means are more efficacious as well as safer.—J. McF. G.]

In the course of a discussion at the Philadelphia College of Physicians ⁹⁶_{July, '96} on the use of the drainage-tube for cases of empyema, Damaso T. Lainé having exhibited a self-retaining drainage-tube for the treatment of empyema, Thomas G. Morton said that he had never used ether or other form of anæsthetic in any of his cases of tapping the chest. The operation is not attended with much pain and is quickly done, and he looks upon the use of an anæsthetic as dangerous. He does not use cocaine either,—for the same reason. In the case of children he applies ice as a local anæsthetic and generally finds it sufficient. With regard to the material from which the cannula is to be made, he thinks that rubber is the poorest that could be selected, because it so easily bends. He presented a self-retaining silver cannula which he had used for some years with complete satisfaction. It has a little shoulder, or projection, which prevents its slipping into the chest. The objection to the instrument exhibited by Lainé is that the openings are too small; they are liable to become clogged up and prevent free drainage.

According to John H. Morgan, of London, ¹⁰⁷⁷_{Apr. 24, '96} it has been

observed at the Hospital for Sick Children that cases of empyema occur in seasons or cycles during certain periods of the year. While in some months there are no cases of this disease admitted, at others they will accumulate in large numbers. A case of empyema discharging by the lungs, in which a cure was effected by operation, is recorded by F. G. Finley, of Montreal.²⁸²
A case of pleuro-pneumonia followed by empyema was treated by R. Harrison Younge²²_{Dec. 12, '94} by means of free drainage, the patient recovering perfectly.

The conclusions of S. G. Bonney, of Boston,⁹⁹_{Apr. 18, '95} as regards the surgical treatment of empyema, are briefly summarized as follows:—

Absolute certainty of diagnosis by an exploratory puncture with an aseptic needle; use of a single aspiration in children, followed, in the event of a re-accumulation, by open incision and drainage; no justification for aspiration in adults except as a mere preliminary to pleurotomy; the performance of pleurotomy in all recent cases, excluding only the employment of aspiration as an initial procedure in children; avoidance of general anæsthesia when practicable; a single opening for drainage, not located in the most dependent portion of the chest; double drainage-tubes to extend but slightly within the cavity; the resection of a small portion of a single rib in case of a fetid discharge or of marked approximation of the ribs; no irrigation of the cavity unless in the presence of considerable fætor, the irrigating solutions to be introduced slowly, of proper temperature, and non-poisonous in nature; observance of scrupulous asepsis during each dressing from the beginning to the end of the case; adoption of multiple rib-resection in the event of an unduly prolonged continuance of the pus-cavity; number of ribs resected and size of section to correspond with the depth and extent of the cavity; exceedingly rare justification for the employment of complete thoracoplasty.

Stephen Paget, of London,⁶_{May 4, '95} observed obscure cerebro-spinal symptoms during the treatment by irrigation of certain cases of empyema, and S. G. Allen⁶_{June 22, '95} describes a somewhat similar case in which iodine injections into a pus-cavity caused grave syncope.

It seems to J. A. Fulton, of Astoria, Ore.,⁵⁹_{Nov. 2, '94} that often the cause of failure to secure the desired results from operation may be due to the incompleteness of the operation. In operating on these cases we may find any one of two or three different conditions to be present: we may find only pus in the pleural cavity; we may find also large masses of coagulated lymph; and, in addition to the former conditions, the wall of the pleural cavity may be lined with

a deposit of lymph varying in thickness from a mere coating to a deposit several lines in thickness. In the last condition, after resection and thorough douching with plain hot water, the entire cavity is gone over carefully with the curette; the douche is kept going all the time, and as fast as the deposit is loosened it floats away. Care is used to avoid wounding the pleura, and curettes with flexible handles are needed so that the entire surface may be reached. After the entire cavity has been thoroughly gone over and everything washed away it is dried and carefully packed, and from that time on treated very much as if it were a large abscess-cavity elsewhere.

The difficulty of the after-treatment of Estlander's operation is well known, as is also the slowness with which the purulent secretion can be arrested in spite of antiseptic irrigations of the pleural cavity. Two cases of R. O. Gredinger³_{Oct. 23, '95} show that the introduction into the pleural cavity of a solution of 30 parts of iodoform to 100 parts of glycerin may be of great value under these circumstances.

W. W. Keen, of Philadelphia,⁹⁶_{June, '95} performed an extensive thoracoplasty, by Schede's method, in a case of thoracic empyema of twelve years' duration, in a man of 30 years of age. When admitted to hospital he was wearing a drainage-tube between the sixth and seventh ribs, just to the left of the nipple-line. He had this continuously for nearly eleven years. About one-half ounce of pus escaped from it in twenty-four hours. The whole left chest was much sunken in.

On March 18, 1894, a vertical incision was made just outside the line of the nipple and about two inches of the seventh and eighth ribs were resected, exposing the upper surface of the diaphragm. Starting from the opening in the chest-cavity, it was with the greatest possible difficulty that Keen could resect the ribs, since they were absolutely in contact as the result of the deformity of his chest. The pleura was also over an inch in thickness, which made the thickness of the chest-wall about two inches, and therefore very rigid. In addition to this the left lung was firmly bound down and so contracted that there was practically little lung-tissue in use. Hence, as his respiration was almost confined to the right lung, ether had to be given carefully, and only two ribs could be resected at this time. He returned for a second operation June 30, 1894. Examination by a long probe showed that the cavity of the pleura was very large and extended to a level with the clavicle. A vertical incision was made from the clavicle to the still existing opening into the chest-cavity, followed by two horizontal incisions at each end of the first. The soft parts were

then dissected from the ribs internally to within an inch of the left border of the sternum and externally to a point an inch posterior to the anterior border of the scapula. Then by bone-forceps, starting from the existing opening, ribs, muscles, pleura, vessels, and nerves—*i.e.*, the entire thickness of the chest-wall up to and including the second rib—were cut; then, starting again from the prior opening, outwardly to a point a little in front of the inferior angle of the scapula skirting the upper surface of the diaphragm; then from this point directly upward, and again horizontally on a level with the second rib. Most of this large mass, on account of its thickness, had to be removed piecemeal; part of it in two or three large pieces. The size of the portion removed

was approximately eight inches vertically by five inches horizontally. The inner wall of the cavity was found to be enormously thickened visceral pleura and pericardium, stretching like a vertical diaphragm from front to back at a point about an inch external to the left border of the sternum. This was thoroughly curetted and swabbed. The flaps were then laid directly upon the thickened pleura and pericardium and sutured in place. His recovery was without incident, though slow. The reaction was very moderate. The operation performed by Keen was subsequently found by him to have been described by Schede as a modification of Estlander's operation,

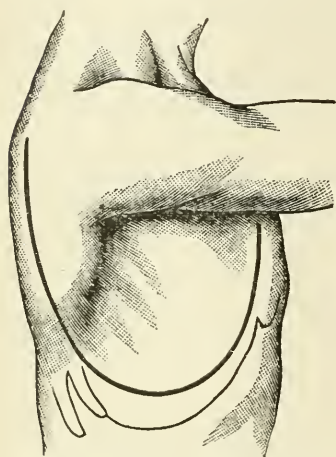


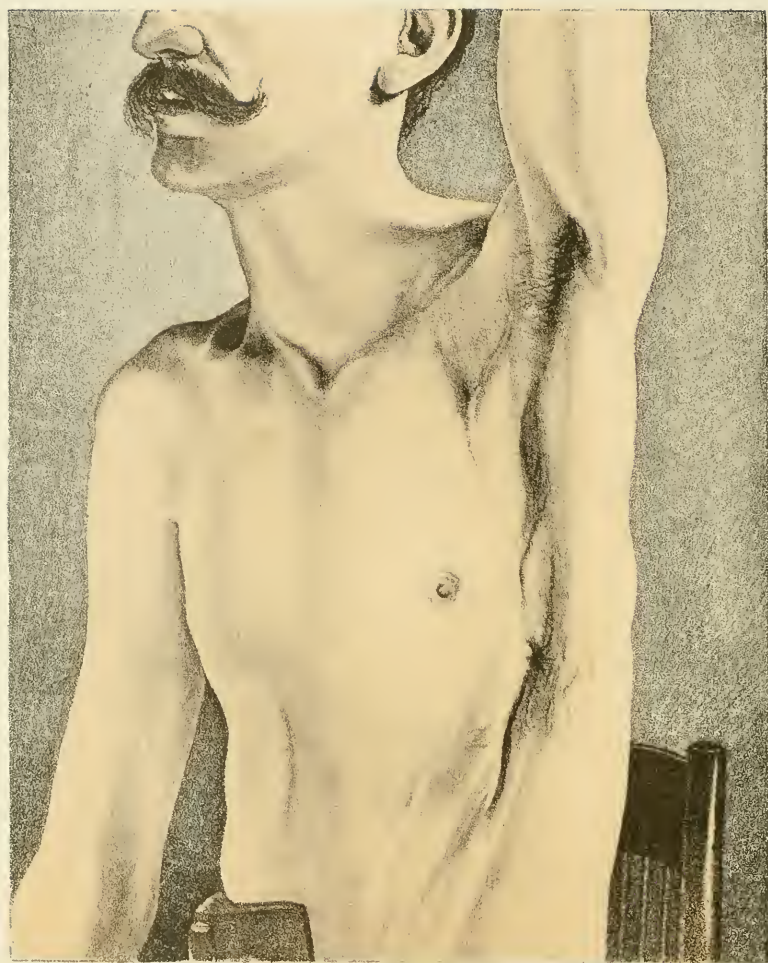
FIG. 1.—SCHEDE'S INCISION FOR THORACOPLASTY. (KEEN.)

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or rather, perhaps, in suitable cases, as a substitute for it. In this particular case Estlander's operation would have been useless on account of the immensely thickened pleura.

Schede makes a large, semicircular flap (Fig. 1), with its base at the second rib, its curve beginning on the front of the thorax and sweeping downward and backward in a large curve which includes the larger part of one-half of the thorax. In Keen's case the soft parts were dissected from the ribs by a vertical incision with two horizontal incisions at the upper and lower ends of the first, forming a shutter-like flap (Fig. 2). It seemed to be equally satisfactory with that of Schede.

The ease with which the operation was done and the admirable result commend it very strongly. Nothing less radical would



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Result eight months after second Operation (Keen)

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have effected a cure. The vessels were controlled without the slightest difficulty by hæmostatic forceps, not even a single one requiring ligation.

The condition of the patient eight months after the second operation is shown in the colored plate. The thoracic wall, where its entire thickness was removed, is as firm and resistant as if the ribs had never been removed. The posterior portion of the ribs forms a marked projecting ridge near the posterior axillary line. It looks as if the resections were much less extensive than described, but this is due to a lateral curvature of the spine to the left, thus making the spinal part of the ribs much more prominent than would otherwise be the case. The movements of the arm are perfectly free, the removal of the greater part of both pectoral muscles having had no restraining effect upon this free shoulder motion. The apex-beat of the heart is in the normal situation.

About this time the wound broke open again and discharged a small quantity of pus. By a third operation some more of the chest-wall at the upper posterior angle was removed. A cavity three and one-half inches long and as thick as the thumb was found. March 27, 1895, this was nearly obliterated by granulation-tissue.

[This operation differs from that of Estlander in the removal of the entire chest-wall, this space being covered afterward by the cutaneous flap which has been previously dissected from the other parietal structures. The excision of certain portions of ribs subperiosteally and leaving all other tissues of the thoracic wall to approximate the viscera within, and thus obliterate any cavity which exists, constitutes Estlander's operation. Whether Schede's operation, as modified by Keen in this case, has any advantages over that of Estlander depends upon the condition of the lining membrane of the thorax; and it would be entirely practicable, by Sprengel's method of medicating the cavity, to excite granulation to fill up the space without removing the wall of thickened tissue. It is more in accordance with the end in view to

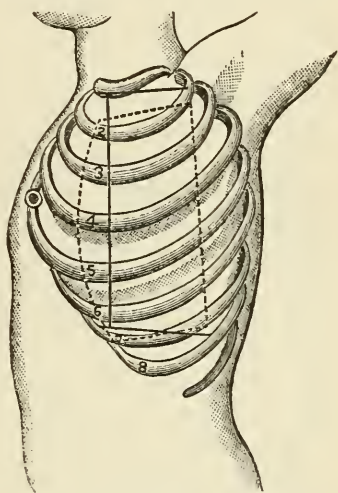


FIG. 2.—SCHEDE'S INCISION FOR THORACOPLASTY. (KEEN.)

The solid line shows the incision made by Keen. The dotted line shows the portion of the bony and muscular chest-wall removed. The posterior line should be farther back.

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leave the soft parts to assist in obliterating the open space, than to depend alone upon a cutaneous covering for the chasm, as done by Keen; and though surgical work should be judged generally by the result, it is a fair deduction that a Sprengel-Estlander operation would have succeeded, and not rendered three operations requisite to effect a cure.—J. McF. G.]

Empyema in Children.—The mortality from empyema in childhood is considered by J. P. Wightman, of Liverpool, ⁶Nov. 30, '93 who states that, the younger the patient, the greater the risk of a fatal termination. The sooner the purulent effusion is removed, the quicker the recovery. Rupture of an empyema through the chest-wall or into the lung is a grave complication, though the latter occasionally leads to spontaneous cure. Apart from the above, danger to life is chiefly threatened by the onset of complications,—viz., (1) pericarditis (among 29 fatal cases at the Liverpool Children's Infirmary ⁶May 5, '94 pericarditis occurred 12 times; in 10 it was of the suppurative form), (2) peritonitis, and (3) septicæmia.

[The tendency of collections of pus in the pleural cavity to point at the anterior part of the thorax when left to a spontaneous outlet has been clearly demonstrated by clinical observation. The site of least resistance, pointed out by Traub and Marshall, about the space between the attachment of the costal cartilages of the fifth and sixth ribs on either the right or left side of the chest, has given exit to the pus in the cases of two children observed by me, who recovered. In a case reported by Ashhurst the head of the abscess appeared to the right and an inch below the left nipple of a young lad in whom there was no history of an injury. At this point an incision was made obliquely to the ribs, and the pus was allowed to be pumped out by the breathing of the patient, a large quantity being thrown out. A second incision was made about six inches below and to the left of the first, and a drainage-tube was inserted, passing through both incisions so as to secure a free and thorough draining off of the pus. J. H. Cox reports a case of spontaneous discharge through the chest-wall, about the seventh interspace, which in a year entirely ceased.—J. McF. G.]

As regards the effect that different methods of treatment have, taken as a whole, he does not think resection of rib renders the chance of cure either greater or less, except in certain cases. At the Hospital for Sick Children, Great Ormond Street, from 1880 to 1892, 214 cases were treated. Of these, 85 were treated during the earlier period by incision, with 16 deaths, and 129 afterward by resection of rib, with 23 deaths, the mortality, as will be seen, being nearly the same in each case. According to Bernard Pitts, ⁶Sept. 9, 10, 23, 30, Oct. 14, '93 Godlee published in 1886 the result of 36 cases.

The majority (19) were treated by resection, the remainder by incision or aspiration. Of these cases only 1 was fatal. In 1894 he published⁶ the results of 118 cases, classifying all treatments together, with 23 deaths. F. E. Batten, of London, June 2,⁶ 94 published the results at the Hospital for Sick Children, Great Ormond Street, for the year 1893-1894. Of 43 cases treated by resection 5 were fatal. Batten asserts that resection is the only treatment for empyema,—a statement which Wightman thinks cannot be accepted without much reserve. E. Cautley, of London, at a meeting of the London Medical Society, Feb. 2,⁶ 95 in a paper based upon a series of 86 cases treated by various methods, gave a mortality of 16.6 per cent. The rate of mortality was the same after resection as after incision, with the exception that 5 out of 6 cases, under 2 years old, treated by resection, were fatal. His opinion was that resection ought only to be had recourse to in cases in which the tube could not be inserted without, when drainage was imperfect, or for the cure of an old sinus. Morison, of Hartlepool, Sept. 29,⁶ 94 (34 cases, with 2 deaths) upholds incision. From the statistics of Jordan Lloyd at the Birmingham and Midland Children's Hospital for the last five years Wightman learns that the total number of cases treated was 123; of these 99 were cured, 20 were fatal, and of 4 there are no records. Among children of 3 years of age and under there were 43 cases; of these 18 ended fatally. In the 99 cases cured the average stay in hospital was seven weeks and a half, the shortest stay eleven days, and the longest 164 days. Resection of rib was performed in 6 cases. The routine treatment is incision and drainage as soon as pus is determined. Resection of rib is exceptional as a primary procedure. If the above figures are put together they number 656 cases of empyema in children, with 104 deaths, giving a death-rate of 16 per cent. The extreme gravity of the disease in a young child may be seen by the following table:—

MORTALITY FROM EMPYEMA IN CHILDREN THREE YEARS OLD AND UNDER

	Cases.	Deaths.
Goodhart (Guy's Hospital Reports),	29	19
Birmingham Children's Hospital,	43	18
Liverpool Children's Hospital,	36	18

These figures give a death-rate of a little over 50 per cent.

A. E. Morison, of Hartlepool, Sept. 29,⁶ 94 supports Wightman's statement that incision and drainage are, in the majority of cases, quite sufficient, which opinion his own results more than justify. Before this question can be regarded as fairly settled, however, further facts are required. The following ought to be known: 1. The percentage mortality of empyema in childhood treated by incision

and drainage (*a*) without and (*b*) with incision of a portion of rib. 2. The average time of healing in each case. 3. The after-results as to deformity, condition of chest, etc, which must be noted and compared. 4. The method of wound treatment which was adopted. This, he believes, is the most important question of all, and explains the differences in result. He gives the following table, showing the number of cases and the result for each year of age:—

	Age.	Number.	Recovered.	Died.
	Under 1 year	4	3	1
Between	1 and 2 years	2	2	0
"	2 " 3 "	5	4	1
"	3 " 4 "	4	4	0
"	4 " 5 "	8	8	0
"	5 " 6 "	2	2	0
"	6 " 7 "	5	5	0
"	7 " 8 "	0	0	0
"	8 " 9 "	2	2	0
"	9 " 10 "	2	2	0
Total,		34	32	2

The percentage mortality of his cases is 5.8. The average duration of treatment from the date of incision to the completion of healing was thirty-two days. He has measured and examined the chests of most of them months after operation, and, except for the scar, finds it impossible to say which side has been affected.

Edmund Cautley, of London, ⁵¹_{Mar., '95} reports 84 cases of empyema observed during the course of ten years past. All were under 12 years of age, 57 under 6 years, but none under 1 year. Fourteen out of the 84 died,—a mortality of 16.6 per cent. Four received no surgical treatment at all; 12 were treated by aspiration, 35 by incision and drainage, and 33 by resection of a rib. From these cases Cautley draws the following conclusions: 1. An empyema may be re-absorbed, especially if the pneumococcus is the cause; but it is bad treatment to leave the case to nature on account of the risk of rupture internally through the lung or externally through the chest-wall. 2. Aspiration is at best a temporary and unreliable mode of treatment; cases recover completely under it, but the risks are out of proportion to the advantages gained. 3. Simple incision and drainage is better than resection of a rib or part of a rib. It is very exceptional in children not to be able to drain efficiently through an intercostal space. Recovery does not appear to be more rapid under treatment by resection, and the shock is more severe. 4. When the medullary cavity of a rib is laid open, there is greater danger of pyæmia. 5. The risk of hæmorrhage is very small under either mode of treatment. 6. It is unnecessary to explore the cavity and break

down adhesions; in some cases it may be distinctly injurious. 7. The chances of a radical cure are certainly no better under treatment by resection, and there is greater liability to imperfect expansion of the lung and contraction of the side in cases treated by aspiration or resection or left to nature than if incision and drainage be adopted. 8. Resection should be reserved for the rare cases in which the ribs are closely approximated or as a secondary means to insure closure of a sinus. 9. The drainage-tube should not be more than two inches long. It is not necessary to insert a long tube, as the mode of cure is not by granulation from the bottom, but by expansion of the lung, ascent of the diaphragm, and contraction of the side. It should be removed as soon as the discharge becomes scanty and serous, sometimes even as early as the third day, otherwise it acts as a source of irritation, keeping up the discharge, prolonging the illness, and militating against a successful cure.

Schütz, of Hamburg, ²⁰⁶⁸_{V.13,p.200} has within the past three years treated 18 cases of empyema in children, the majority being metapneumonic cases following influenza; 2 patients under one year succumbed, but the other 16 recovered, almost all without any thoracic deformity. The author recommends operation as soon as a diagnosis can be made in these cases, as delayed operation may be followed by dangerous after-effects. The best operation—and the only one to be recommended in childhood—is, in his opinion, costal resection. The dangers of chloroform are less in the child than in the adult, the former being more tolerant of the drug and also having a stronger heart, enabling him to overcome the disturbance caused by empyema in the lesser circulation, and also the sudden removal of the exudate. Treatment by siphon drainage is not favorably regarded by him, for the reason that children, being restless, are liable to pull out the drains, allowing air to penetrate into the pleura and the wound to become infected. In operating Schütz advises circumscribing of the inferior and posterior borders of the healthy lung and resecting, on the diseased side, the rib situated two or three centimetres above this limit, near the vertebral column.

Countts, of London, ¹⁰⁹³_{June, '95} generalizing from an experience of some hundreds of cases, predicts that, while rib-resection will hold its own as the best for the more robust, simple incision will, to a large extent, replace that operation in infants and the debilitated.

H. Toulmin, of Philadelphia, ¹¹¹²_{Aug., '95} records a case of pulsating empyema in a child of 5 years. Resection of a rib was followed by recovery.

Martinez Vargas, of Barcelona, ³_{Aug.21, '95} has observed 5 cases of

empyema in children,—2 following pneumonia and 3 influenza. In 4 of them he was able to detect an elevation of the antero-superior portion of the thorax, which is a positive aid in diagnosis.

Transient clubbing of the fingers was noticed in one case of empyema by Schon,³⁷⁵_{No.6,'95} becoming very marked after operation. The terminal phalanges were enlarged, both from side to side and in the dorso-volar direction; the nails were abnormally convex, but their color natural. The deformity quickly disappeared, and, by the time the sinus had closed, the patient's fingers were quite normal again. (Report of Corresponding Editor F. Levison, Copenhagen.)

Pleural Effusion.

In some cases of operations for fluid on the chest and abdomen, recorded by Samuel West, of London,²_{Apr.27,'95} the chief points of interest are the following: 1. After the pleura had been full of fluid for twelve months and more the lung should not be bound down, but should be capable of rapid re-expansion. 2. The number of times the side was tapped and the probabilities that complete cure might in the end have been obtained in this way. 3. The fact that after thirty-seven tappings the fluid remained clear and serous as at the first, and that, too, in spite of air having been admitted more than once into the pleura. 4. The opening of the side for a simple serous effusion. 5. The ultimate complete recovery, with practically no deformity and perfect re-expansion of the compressed lung. The advice given in text-books, to abandon paracentesis after two or three trials followed by recurrence, requires, in his opinion, to be modified, for no risk attaches to repeated paracentesis if the operator is careful to keep his instruments aseptic. He points out that, in abdominal tuberculosis, simple tapping is often enough to determine a cure; so that there is no necessity to open the abdomen.

In a paper on the treatment of pleural effusions W. E. Ashton, of Philadelphia,⁸⁰_{Sept.15,'94} draws the following conclusions: 1. The tubercle bacillus is the cause of the majority of cases of pleurisy. 2. A certain number of cases of pleurisy are due to rheumatism. 3. We should employ the salicylates in the treatment of the rheumatic cases, as having a specific action. 4. The salicylates are of value in cases of other than rheumatic origin. 5. As a rule, purulent effusions demand evacuation and free drainage.

[Medication as a preventive and a curative agency in pleuritic effusion is worthy of trial before having recourse to aspiration. As there is a great tendency, after repeated tapping of the chest, in cases of serous effusion, to the development of pus, it is claimed

by many observers that all the possible medicinal agencies should be used persistently at the outset to remove such accumulations. The results attending such practice have been very encouraging, and it is evident that, in the cases where the interthoracic fluid has been absorbed under the influence of medication, it is less likely to accumulate again than when it is removed by aspiration. Active measures of treating pneumonia and pleurisy in former times left but few cases to develop serous pleural effusion, and there is a growing tendency on the part of general practitioners and of some surgeons to attack vigorously by medication all cases of serous accumulations within the thorax. It is demonstrated that the transition to empyema is averted frequently by medication.—J. McF. G.]

In giving the note of a case of serous effusion into the pleura treated by free incision and drainage after repeated tappings had failed, Rutherford Morison, of Newcastle-on-Tyne, ²_{July 18, '95} states that he made a free incision into the pleural cavity in the middle axillary line, and inserted three inches of large-bored India-rubber drainage-tube. Fluid rushed from the tube during its escape. On several occasions, fearing that so sudden an emptying of the cavity might cause serious disturbance, he restrained the flow. The patient, however, only felt relief, and made no complaint of pain or discomfort except a weak sensation. She steadily gained ground for a fortnight, at the end of which there were no physical signs of any chest derangement, except slight impairment of the percussion note and some weakness of the breath-sounds.

A case of obstinate pleuritic effusion with negative pressure in the pleura, under the care of Samuel West, of London, ⁶_{Mar. 16, '95} is interesting as showing how rapidly air is absorbed from the pleural cavity even when it has been some time inflamed, and how rapidly the lung may re-expand. That a negative pressure of as much as four inches of water should exist with an increasing effusion seems to him almost inexplicable, yet it is confirmed by the failure to obtain fluid and by the passage of air into the side. This could not have happened with a positive pressure of such an amount. That the negative pressure of four inches should be converted into a positive pressure of four inches and a half is due to the rapid increase in the amount of the fluid after the first dry puncture, as was shown by the fact that three days later ninety-seven ounces of fluid besides much air were removed without suction from the side. Although the introduction of air in this case was accidental, while in other cases its introduction has been intentional, the rapid resolution of what appeared to be an obstinate effusion shows that the admission of aseptic air into the pleura may be in certain cases

not only a justifiable, but even a very successful, method of treatment of chronic effusion.

J. Svenson ³⁷⁰ ⁶⁷³ dwells on the necessity of preventing air from entering the pleural cavity, failure to do this accounting for many of the unfortunate sequelæ so frequently noted. He describes a trocar invented by himself which obviates this danger, and which combines the advantages of enabling the operator to thoroughly wash out the cavity, to remove any clots, etc., without drawing out the instrument, and also of being easily sterilized by boiling. The author is in favor of early puncture, and does not advise waiting for the chances of resorption. He prefers thoracotomy to any other operation, as being more safe and reliable, and especially recommends it in cases of fetid, ichorous empyema. (Report of Corresponding Editor Eklund, Stockholm.)

A review of the subject and a report of five cases of thoracentesis is given by N. H. Pitman. ¹⁹⁹ ^{Sept., '95}

In reporting a case of displacement of the heart following thoracentesis E. Cassæt, of Bordeaux, ²⁵ ^{Mar., '95} calls attention to the importance in these cases of searching for traces of a previous inflammatory affection causing adhesions limiting the mobility of the organs, and especially of the heart, which is destined to replace in the thoracic cavity the fluid removed by puncture.

Pneumothorax.

F. Barjon, of Lyons, ¹⁰⁴³ ^{July, '95} in describing a case of essential pneumothorax with gaseous abscess, refers to the fact that certain as yet undetermined microbés, the existence of which has been proven by experiments, are capable of producing gas within tissues, and that these germs, becoming localized under the skin and in the intra-muscular tissue, constitute gaseous abscesses. This being the case, the theory that they also develop in large serous cavities, and especially in the pleura, does not seem to him unreasonable, while its importance from a pathogenic point of view is evident. The old essential pneumothorax has not yet come out from under the condemnation of Béhier and Proust, and modern authors are reserved and even doubtful as to the existence of this affection. Netter ²⁰⁶⁵ formally denies its possibility; Galliard ²⁰⁶⁹ and E. Jeanselme ²⁰⁷⁰ timidly admit its occurrence, though considering it rare and exceptional. Barjon himself believes that this modern view is somewhat too exclusive, and regrets that Frænkel and Arloing, who both obtained positive cultures of these microbes and produced subcutaneous and intra-muscular gaseous collections by inoculation into animals, did not finish their work in this direction.

He himself has endeavored to verify his hypothesis, but the failure of his cultures in the case in question prevented him from doing so.

Gérard Marchant, ³⁵_{Nov. 2, '95} in a paper on the surgical treatment of pyopneumothorax in tuberculous patients, shows that thoracotomy here affords relief in only exceptional instances. When the general condition permits of it, a wide costal resection is the proper procedure. Simple aspiration with an injection, always dangerous in such cases, is powerless against the cause of suppuration and against the pleuro-pulmonary cavity. The operation for empyema arrests the effusion, but is insufficient in regard to the pleuro-pulmonary perforation, the exact spot of which is difficult to determine. Clinical evidence is here valueless, but pathological anatomy shows that pleuro-pulmonary fistulæ, often multiple in tuberculosis, have a definite site. This, according to Béliier, is in the upper lobe, at the level of the third and fourth ribs, in the medio-lateral portion,—an opinion shared by Walsh, West, and Weit. Germain Sée places it between the anterior border of the lung and the axillary line. The large opening made by a lateral incision permits the area to be discovered, and if the pleura is thickened, as in one of the author's cases, it can be explored with a cannulated sound, which will lead to the diseased area; it will then be easy to ascertain the limits of the latter by resecting the ribs, sometimes in front of and sometimes behind the axillary line, according to the position of the area or the retraction of the lung. It will also be easy to see the orifice of communication, which is sometimes distinctly circular, like a funnel, and large enough to admit the end of a pen-holder, as in a second case of the author's. Sometimes, on the other hand, it is less apparent, consisting of a sort of valve which opens on inspiration and becomes glued together on expiration, as in Marchant's first case. This fistula, which resists all other treatment, closes rapidly after wide resection. The author regards this spontaneous occlusion after costal resection as a most curious thing, and believes that this adhesive pleurisy is favored by three factors: 1. The suppression of the passage of pus through the fistula, this being carried off by drainage through the external incision. 2. The disappearance of the pleural cavity; here the obliteration of the costal wall, which has been deprived of its natural supports, favors union of the soft parts with the retracted lung. 3. The lung itself, in expanding, tends to contract the orifice of communication. These, of course, are mere hypotheses, but the fact remains that spontaneous recovery of the fistula occurs in the first days following costal resection. Tamponading of the pleural cavity may also have some influence here. Mar-

chant calls attention to the danger of pleural irrigation when a pulmonary fistula is present, and states that in his first patient he had seen its employment followed by suffocation with asphyxia.

Carl Beck, of New York, ¹_{June 15, '95} in discussing the subject of exploratory pleurotomy and resection of costal pleura, expresses the opinion that, as there can be no doubt that exploratory incisions of the pleura, if done under the necessary precautions, will prove to be free from danger, they should be undertaken whenever there arises any such doubt, as in a case reported by him. As to the diagnostic value of this method, it may be urged that in this case the exploratory incision proved the presence of an enormously degenerated pleura and the absence of solid masses. That the resection of thickened pleural tissue will relieve compression is also obvious. To what extent it can, however, be utilized in practice will, of course, not be pointed out by a single case. As the whole thickened area was not removed, a fair amount of degenerated tissue remained; but it appears to him that if only a portion of it, especially the thickest part,—in other words, if a great obstacle to the free expansion of the lungs,—is removed, there are all chances of compensation.

Pyopneumothorax.

N. Stone Scott, ²²²_{Aug., '95} finds that the diagnosis of circumscribed pyopneumothorax is at times extremely difficult, and believes that all obscure cases should be explored with an aspirating needle. The prognosis is good, the large majority of cases recovering. Cases which have discharged through the bronchus and are improving should be treated by the tonic and stimulant plan. Cases which are not improving, whether or not there are manifest signs of septic absorption, should have a pleurotomy performed in such a manner as to secure thorough drainage of the cavity.

Laache, ³⁶⁹_{p. 1021, '94} ⁶⁷³_{May, '95} in a case of this kind with the ordinary symptoms, practiced resection of the eighth rib and found the cavity of the pleura empty. At the end of two days the abscess could be opened, when a large quantity of pus escaped. It was mixed with air, had a faecal odor, and contained numerous black points which gave the reaction of hæmin. In another case there was perforation of the diaphragm, with empyema. Operation for the latter was followed by the resection of several ribs and led to considerable improvement in the patient's condition. Complete recovery, however, did not take place, as a fistula persisted, opening at intervals of two or three weeks and giving exit to a varying quantity of pus. The author is of the opinion that a narrow communication must have existed between the abdominal cavity,

where the abscess first formed, and the pleural cavity. Thue³⁶⁹_{p.1030,'94} also describes a case of subphrenic pyopneumothorax in which the diagnosis was verified by autopsy. (Report of Corresponding Editor Levison, Copenhagen.)

Lardy, of Constantinople,²³²_{June 30,'95} reports a case of old pyopneumothorax operated on by Delorme's method. This procedure, described by Delorme,⁹¹_{p.390,'93} consists of a vertical incision of the skin and soft parts from the third to the sixth ribs, slightly within the mammary line, and forming a flap with a postero-superior base by means of two incisions, one parallel to the third and the other to the sixth rib. The soft parts being dissected away from the ribs and the flap directed backward, the ribs and the intercostal space at the anterior limit of the wound are resected, and the ribs posteriorly are separated or slightly resected, the intercostal space being left intact. This done, the "shutter" is freed above and below from the upper edges of the corresponding ribs and swung outward. The interior of the thoracic cavity is thus extensively uncovered. Lardy's case was so successful that he recommends it most warmly in cases of pyopneumothorax.

[The description of Delorme's method given by Lardy is not in accordance with the details of it presented in the contribution to this department for 1894; and to have a proper understanding of this matter a short extract from the text on page 6 of that article may be inserted, as follows: "An incision representing the three sides of a rectangle is made in the region between the third and sixth ribs. The base of the flap thus formed is directed posteriorly and above, and its upper and lower margins run parallel with the ribs and extend from the axillary border of the scapula to within two fingers' breadth of the sternum. At the anterior margin of the flap *the ribs and intercostal muscles* are severed, while at the posterior margin only the ribs are divided to a limited extent. The flap is then loosened at its upper and lower margins and thrown back. After the completion of the operation the flap is replaced and sutured to the thoracic wall." The process described by Delorme consists essentially in the formation of a flap from the soft parts of the thoracic wall and the ribs, which, when retracted, affords wide access to the field of the operation. It is solid, and not in two layers as above stated. I have verified by dissection of the cadaver that an important modification of this procedure is available for reaching the cavity of the chest. This consists of section in the axillary line—or farther back, if desirable—of the ribs covering the area for examination, and from this perpendicular incision cutting along the intercostal spaces anteriorly until the costal cartilages are reached. Then, lifting the flap

upon this flexible, hinge-like attachment, the operator is able to explore the portion of the thorax thus exposed. Upon opening the left side of the thorax in this manner, by division posteriorly of the second, third, fourth, and fifth ribs and making an incision forward to the costal cartilages of the highest and lowest ribs, through the intercostal spaces, I was enabled to raise the flap without difficulty to a right angle with the sternum. This permits access to the upper division of the thoracic cavity and brings the left portion of the mediastinum under direct observation, without any undue tension upon any of the tissues. Instead of the complete section in front and partial division of ribs behind, as in the process of Delorme, there is only one vertical division of ribs in the axillary line which admits of suture afterward.—J. McF. G.]

L. Galliard, of Paris, ¹⁴_{Nov. 17, '95} observed a case of pyopneumothorax in which the pus migrated to the lumbar region. The patient died at the end of two months, and, at the post-mortem examination, the right pleura was found to be entirely devoid of pus and the lung reduced to a shapeless stump. The costodiaphragmatic sinus was posteriorly the seat of a sort of infundibulum, the lower extremity of which passed below the last rib and continued by means of a track five centimetres long, through the muscles of the loins, ending in the pocket of pus which the author had opened during life.

Tubercular Abscess.

According to Fabricans, of Cracow, ⁶⁹⁶_{Oct. '94} pneumonotomy is as yet an infrequent operation, as in the literature of the last twenty years he finds only thirty-one cases in which it has been done for abscess and twenty-six for pulmonary gangrene. He himself reports a case in a man, 42 years of age, who had in the upper lobe of the right lung a cavity which had probably formed after a local pulmonary gangrene. Expectoration was putrid. Grube made an incision in the second intercostal space and opened a small cavity with the thermo-cautery. Eleven days later a large adjacent cavity opened spontaneously into the wound, when recovery followed, being complete in forty days.

Réclus, of Paris, ¹¹⁵³_{Oct. 19, '95} condemns pneumonectomy, which can be practiced with any chances of success only in cases which might prove amenable to medical treatment. Pneumonotomy, even, can only be applied in exceptional cases of tuberculous cavities and dilated bronchi. In either of these affections, when the patient has overcome the risks of an operation, which is always formidable to the cachectic, and has begun to experience the bene-

fits of drainage of the cavity, the primary malady is still progressive, and pneumonotomy, if it has not hastened death, has only retarded it. On the other hand, when the pulmonary excavation constitutes the essential lesion, when the symptoms of putrid absorption predominate and excite much fever, and when the patient suffers much from cough and is exhausted by the abundant expectoration, the surgeon, it is acknowledged, may have recourse to pneumonotomy not in the vain hope of cure, but simply to afford some relief.

Walther, of Paris, ³_{Oct. 23, '96} distinguishes between cavities of recent formation and those of long standing. After a recent cavity has been opened for a circumscribed area of gangrene, for instance, it will be seen that, after rapid elimination of the splacelated portions and disinfection for several days by means of a suitable dressing, the walls of the cavity begin to bud, to swell up, and to take their place in front of the thoracic wall, which has been liberated by a sufficiently extensive costal resection. In old cavities, however, the area of disease is surrounded by extensive chronic sclerosis, with aneurismal dilatations, which may cause grave and often mortal hæmoptysis. Whatever be the nature of the disease—pulmonary gangrene, abscess, or interlobar pleurisy evacuated through the bronchi—the chief obstacles to reparation of the cavity and to recovery are pulmonary sclerosis and chronic bronchitis with dilatation. The lung does not participate in the process of repair, and the cavity cannot close up except by causing great depression of the thoracic wall. In this case simple resection of the ribs is not sufficient, and total resection by Schede's method must be employed. The conditions for repair are worst where there is great dilatation of the bronchi, the sclerosis being extensive; yet even here surgical intervention may give good results. Walther cites the case of a woman, 26 years of age, with all the signs of partial pyopneumothorax of the lower part of the left pleura, in whom incision of the hard and sclerosed pulmonary tissue gave access to a cavity occupying the entire lower lobe of the lung and having the appearance of an enormous bronchial dilatation. An extensive resection caused the disappearance of the cavities and diminution of the expectoration. There remained but a small upper diverticulum after a couple of months, which Walther opened after resecting the fourth and fifth ribs, destroying with the thermo-cautery several orifices communicating with the bronchi. Ten months afterward the patient appeared to be definitely cured, the old lesions of chronic bronchitis of the upper lobe being present, but the large cavity of the lower lobe having entirely disappeared.

Péan, of Paris, ¹¹⁵³_{Oct. 23, '95} contends that simple and gangrenous abscesses, when they are of limited extent, show no tendency to cure, and threaten life, are amenable to surgical treatment. In such case the results are almost always favorable. It is advisable to open, scrape, drain, and even cauterize tuberculous abscesses of the lung when these cause severe pain, have resulted in fistulæ, or contracted extensive adhesions with the pleura. It is often useful in such cases to associate with this treatment partial resection of ribs. No benefit is likely to result from excision of the fragments of lung surrounding the tuberculous cavities, as the tubercle bacilli have already spread beyond the apparent limits of the disease.

Tuffier ³⁰³_{Oct. 23, '95} presented at the last French Congress of Surgery a man, 29 years old, in whom, four years previously, he had performed pneumonectomy. Signs of tuberculosis had been localized in the apex of the right lung. An incision had been made in the second intercostal space and an extra-pleural pneumothorax established by detaching the parietal layer of the pleura over a considerable extent. The apex of the lung at once presented and the diseased area, as large as a nut, together with healthy lung-structure for a distance of two centimetres in every direction, was excised. The wound was closed without drainage and the patient was up and about on the ninth day. Tubercle bacilli had been found in the sputum and were also found in the excised tissue. The patient had followed various pursuits in the four years following the operation, but had suffered from no pulmonary disturbance, and physical examination failed to disclose any evidence of return of the disease. It was not contended that similar operative intervention is generally applicable, but that exceptionally it is indicated.

[This case was duly noted in this department of the ANNUAL when it was first published, and there was extensive reference to it in the medical journals of this and other countries; so that it affords a most interesting record now to present the history of the case after the lapse of four years since the cure by this operation. The most interesting feature of this excision of the diseased apex of the lung is that the patient has not suffered from any pulmonary disturbance since and that there is no evidence of return of the disease at the date of the report. According to the table of Trzebicki the operations of pneumonectomy are limited to five cases, presumably those of Anthony, Tuffier, Tilmanns, Lawson, and Jennings, but there are doubtless others of which no record is given. For instance, a case of pulmonary gangrene is reported by Delagenière, in which resection of lung gave a favorable result.

He maintains that the operation for pulmonary gangrene has failed because surgeons have been content to drain the gangrenous focus instead of extirpating it as completely as possible.—J. McF. G.]

Delagenière, of Mans, ³_{Oct. 23, '95} insists on the relation between pleural and pulmonary surgery, especially in septic affections, which comprise the majority of cases operated on. As inoculation of the pleura would be fatal, the latter, in operations on the lung, should always be drained and disinfected. This may be accomplished by resecting the sixth, seventh, eighth, and ninth ribs and draining the costo-diaphragmatic *cul-de-sac*. Opening of the serous membranes in the track of the eighth rib permits of exploring the pleura, the lower lobes of the lung, and the interlobar scissuræ, on condition that an additional rib, the fifth, be removed. Access to the lesion may be facilitated by freeing the parietal pleura from its ribs, as the author has recently done in a case where it was necessary to separate the stump of the lung from its visceral pleura. He has also successfully carried out these ideas in three cases of lesions of the lower lobes,—one of extensive gangrene, one of a large suppurating hydatid cyst, and one of abscess. The pleural indications are the same in affections of the upper lobes and apex, but the pulmonary lesion must be treated separately, either by a second operation done in the same sitting or, in certain cases, in a separate sitting afterward.

Bazy, of Paris, ³_{Oct. 23, '95} calls attention to the usefulness of exploring the pleural cavity in order to recognize the seat of a pulmonary lesion. He operated, in January, 1894, on a young man of 20 years, suffering from pulmonary gangrene with abundant expectoration. All the signs appeared localized to the base of the right lung. Having made an incision ten centimetres long parallel to the ninth rib, he resected six centimetres of the eighth and ninth ribs. The pleura appearing to be normal at this point, he incised it sufficiently to introduce the index finger, and explored the pleural cavity in every direction. He met with some adhesions above, at the level of which the lungs appeared to be indurated. He therefore closed his first incision and made another transverse one corresponding to the fourth rib, resecting this and the third for a distance of three centimetres. Then with the thermo-cautery he incised the lung, finding a cavity filled with badly-smelling pus. He curetted this cavity and put in a drain to a depth of ten centimetres. The immediate result was remarkable, but, unfortunately, the patient died four or five months afterward of an attack of epilepsy. F. Krause, of Berlin, ⁴_{Apr. 22, '95} operated in a case of pulmonary gangrene in which the pleura was healthy, the patient recovering perfectly.

Gangrene of the Lung.

Podrèze ³⁵_{Nov. 16, '95} performed pneumonotomy in a case of gangrene of the lung in which the expectoration had been abundant and fetid for two years. The lesion had primarily been in the right lung, but the patient had recovered spontaneously, the communication of the diseased portion with the bronchi having been sufficient to expel the dead tissues. The same accident, but more severe, followed in the left lung, with fever and expectoration, the latter being as much as 300 or 400 cubic centimetres ($9\frac{1}{2}$ to $12\frac{3}{4}$ ounces) in twenty-four hours. The case being considered serious, Podrèze operated under ether, making an incision twelve centimetres long, from above downward, in the left subclavicular region. Having separated the periosteum of the second and third ribs, he excised pieces three centimetres long. The parietal layers of the pleura not being adherent in the upper portion of the incision, he sutured them, and, having made a transverse incision of the lung, from which issued a considerable quantity of exceedingly fetid pus with pulmonary *débris*, he curetted the walls of the cavity, washed it out with a $1\frac{1}{2}$ - to 1-per-cent. solution of phenol and boric acid, and tamponed with iodoform gauze. After the third dressing the pus had lost its fetid character and had diminished in quantity. The wound healed in three weeks, and in forty-five days after operation the patient had gained 14 kilogrammes (31 pounds).

Réclus ¹¹⁵³_{Oct. 19, '95} ²_{Nov. 30, '95} states that pneumonotomy is indicated in those cases of pulmonary gangrene in which the cavity, though distinctly circumscribed, is large, and when there are evidences of toxæmia through retained putrid contents. In cases of abscess of the lung, also, the results of pneumonotomy have been favorable, Réclus having met with complete success in twenty out of twenty-three cases. The prognosis of pulmonary abscess, it is pointed out, depends on the primary affection. Pneumonia is the most frequent cause of the localized suppuration, and surgical treatment in purulent collections of this organ has been attended with a large proportion of good results. In the performance of pneumonotomy the incision of the skin and muscles, made in the shape of a **U**, an **H**, or a **T**, according to the choice of the operator, should allow of free exposure of the ribs. The surgeon should give himself full access to the pulmonary cavity, and lay it open to an extent permitting rapid and complete detersion. Moreover, free removal of the osseous wall of the thorax favors contraction of the cavity and apposition of its walls. In order to prevent serious hæmorrhage Réclus uses, in opening the cavity, a thermocautery just heated to a dark-red color. The opening thus made

can afterward be enlarged by introducing the finger. Failure of an exploratory puncture need not contra-indicate pneumonotomy. Even though the surgeon may fail after resection of one or more ribs to find pus, the operation will not be less profitable. The cavity which has been missed will, as has been proved by abundant experience, ulcerate or break through the walls at this point of least resistance. The cavity when opened should be carefully and freely drained. Réclus is strongly opposed to the use of injections. In one reported case, he states, the injection of a solution of boric acid and thymol was followed by fatal inflammation of the air-passages.

Tumors.

Hydatids of the Lungs.—In relating two cases of hydatids of the pleura and omentum Sidney Coupland, of London, ⁶_{Sept. 21, '95} gives the following table, drawn from the work of Davies Thomas ²⁰⁷¹ and from hospital reports:—

TABLE SHOWING THE RELATIVE PROPORTION OF PATIENTS ADMITTED INTO HOSPITAL SUFFERING FROM HYDATID DISEASE.

PLACE.	Total Number of Patients in Hospital.	Number of Cases of Hydatid Disease.	Proportion of Hydatid Disease per 1000 of all Patients.
Middlesex Hospital (medical wards, 1867-1893)	32,319	44	1.3
London Hospital (medical wards, 1876-1881)	13,297	24	1.7
St. Bartholomew's Hospital (medical and surgical wards, 1860-1884)	115,402	108	0.9
St. Thomas's Hospital (medical and surgical wards, 1871-1881)	34,559	44	1.2
St. George's Hospital (medical and surgical wards, 1865-1879)	45,599	22	0.5
Breslau	85,062	20	0.2
Vienna	360,713	38	0.1
Iceland, Ofjord (by Finsen)	596	16	28.5
Australia, Victoria (8 hospitals)	134,104	835	6.2
“ New South Wales	35,760	103	2.8
“ Adelaide	38,671	175	4.5
New Zealand	40,271	54	1.3

In one of the author's cases hydatids of the pleura simulated pyopneumothorax. Paracentesis and drainage were followed by recovery.

Chapple, of Dunedin, N. Z., ⁵⁵⁷_{July 1, '95} in describing an instance of hydatid of the lung, states that it bears out much that has been already laid down,—viz.: In suspicious cases the expectoration

should always be carefully examined. In his case there was similarity between the expectoration and the fragments of endocyst and mouthfuls of water that accompanied them. A very much earlier diagnosis would, therefore, have added considerably to the patient's safety. In cases of long standing and the area of dullness large, indicating a large and tense cyst (should the case prove to be hydatid), aspiration is distinctly contra-indicated as a method of cure. If the examination of the expectoration fail to reveal hooklets, or laminated endocyst, or any sufficient evidence to prove the existence of hydatid, puncture with the finest exploring-needle may be justifiable for the purpose of diagnosis; but then only a small quantity should be removed. The number of fatal cases following aspiration, when the chest contains some quarts of hydatid fluid, is too numerous, and the results of radical operation too satisfactory, to justify the risk of flooding of the lungs. So far as he can see, it is not the actual puncture by the needle that induces the coughing; it is the sudden diminution of intra-cystic tension, with the accompanying relaxation of pressure of the surrounding bronchioles, that excites the irritation of the bronchial mucous membrane and results in coughing. Pressure on the bronchial tubes being diminished, their normal calibre is regained, pent-up secretion is set free, irritation results, and with the increased respiratory freedom the expiratory expulsive force becomes much greater, and bursting of the cyst into the bronchi is the unfortunate result, the aspiratory needle being too small to allow of anything but the most tedious escape of the fluid. In the radical operation, on the other hand, the tension is barely (if at all) diminished, until a free opening into the cyst makes this channel the line of least resistance; and even though coughing supervene, it only increases the rapidity of the flow through the wound. With regard to irrigation of chest-cavities the weight of opinion is against the procedure. Robinson, however, who described a case in which he had constantly flushed out the chest-cavity and which led to the discussion, justified the procedure on account of the fetid pus and high temperature. In Chapple's opinion the resection of a rib is not always necessary and need not be undertaken if the condition of the patient or the contents of the cyst contra-indicate it, as the endocyst of very large hydatids can easily be expelled through an opening of the diameter of the interosseous space, while the ribs can be kept apart by placing a thin metallic oval tube inside an India-rubber one.

Péan, of Paris, ¹¹⁵³_{Oct. 23, '95} states that when it is advisable to open hydatid cysts of the lung the surgeon should take advantage of adhesions when they exist, and establish still further adhesions if

those existing are not of sufficient extent to enable the operator to wash out the cavity with antiseptic solutions.

Réclus¹¹⁵³_{Oct.19,'95} considers that pneumonotomy is very beneficial, and is in reality the best treatment, in hydatid cyst of the lung. Cases cured by pneumonotomy are described by Jonnesco, of Bucharest,³_{Oct.23,'95} and by Doyen, of Reims.³_{Oct.23,'95}

Cancer of the Lung.—Réclus, of Paris,¹¹⁵³_{Oct.19,'95} objects to pneumonectomy in cancer of the lung. In the exceptional cases in which the neoplasm extends from the thoracic wall to the lung, however, extirpation of the invaded parenchyma may, in his opinion, be permissible; but, at the same time, he thinks that abstention from such treatment would, in most instances, be preferable. Extirpation of primary cancer of the lung should, he holds, be positively abandoned. If the tumor be a single and small one, it will probably reveal no sign of its existence; if it be large, diffused, and multiple, an operation would inevitably be fatal. Péan¹¹⁵³_{Oct.23,'95} believes, on the contrary, that solid tumors of the lung should be extirpated when superficial, taking advantage of adhesions when some exist and establishing adhesions when those present are not of sufficient extent. The opportunities for such a procedure are necessarily rare, such growths being almost invariably secondary.

Injuries of the Lung.

Penetrating Wounds.—Quénu,¹⁴_{Nov.10,'95} in reporting two cases of penetrating wounds of the thorax, remarks that in one of them the intercostal artery had not been wounded; the seventh rib having been resected, the pleura was incised and the lung found to be retracted except in the lower portion, where it was adherent to the parietal pleura, some blood-clots, which were located here, being removed. The cavity was filled with iodoform gauze, which, when removed several days later, was found to be scarcely tinged with blood; fifteen days later the patient left the hospital cured. Quénu believes that in cases of hæmorrhage following traumatism, which, however, may be followed by recovery without incision, intervention should be practiced more frequently than it is, being free from danger and favoring retraction of the lung. It is naturally more strongly indicated when the hæmorrhage is persistent. Berger, in the discussion, said that the hæmorrhage could often be arrested by tampons. Delorme believed it best to wait and see if the hæmorrhage were not spontaneously arrested before operating or until symptoms of infection became evident.

Michaux³_{Oct.23,'95} states that, of eleven cases of wounds of the lung surgically treated, in only four was there hæmorrhage. He

believes that the mortality in cases of extensive effusion of blood, of pleuro-pulmonary origin, is at least 50 per cent., and that surgical intervention is therefore justified. Hæmorrhage is not the only indication, hernia of the lung and the presence of foreign bodies of greater or less size also warranting operation. Two cases operated on by him for small cavities in the lungs led him to the conclusion that these organs are extremely tolerant of traumatism, since he was able to puncture and incise with the thermo-cautery without causing much hæmorrhage or later untoward results.

In a case of penetrating wound of the chest the course recommended by A. Didier, of Lille, ²²⁰_{Mar. 23, '95} is that advocated by Huguot and Péraire, inspired by Terrier and Lucas-Championnière, ⁹¹_{Jan., '95}—viz., absolute immobilization. According to these writers the wounded person must be left in the place where he received the injury or in the immediate neighborhood. He must be carefully placed on a mattress, avoiding the least movement. The clothing must be cut away in order to expose the wound, which must be washed with an antiseptic tampon and occluded by means of a layer of iodoform or salol collodion after being sutured. The patient must at all hazards be prevented from moving, speaking, gesticulating, and even, if possible, from coughing, expectorating, or swallowing. To this end but a teaspoonful of some strengthening drink must be given to him, and that some hours after the accident. No unnecessary visitor must be admitted into the room, a person being left to watch him and prevent any movement. If there is agitation and suffering the physician may give an injection of 0.005 to 0.01 gramme ($\frac{1}{12}$ to $\frac{1}{6}$ grain) of morphine; if, on the other hand, there is depression, and if the internal or external hæmorrhage has been considerable, he should alternate subcutaneous injections of artificial serum with injections of caffeine. Syncope, when not unduly prolonged, offers no danger, but, on the contrary, favors hæmostasis.

Tuffier of Paris, ²²_{Nov. 27, '95} before operating in a case of shot wound of the thorax, in which surgical intervention appeared to be indicated, introduced a small trocar and drew off a few drops of liquor, which, submitted to examination, was found to be free from any septic agent. The operation for pyæmia was accordingly not performed and the patient recovered. From an experience of three cases of this kind he concludes that a rise of temperature can be observed in cases of hæmothorax following wounds of the lungs leading to suspect a purulent infiltration, which nevertheless necessitates no surgical interference.

Folet, of Lille, ¹⁸¹_{May 10, '95} cites two interesting cases of penetrating

wounds of the chest by revolver-balls. In the first case the ball penetrated the lung and became encysted without the slightest accident. In the second case the bullet entered the right side of the thorax above the liver and re-appeared under the skin. It was easily extracted, but the patient showed serious symptoms leading to the diagnosis of hæmopneumothorax with extensive subcutaneous emphysema. There was no hæmoptysis. The effusion became suppurative, and cure was only obtained at the end of several weeks by pleurotomy with costal resection and repeated antiseptic irrigations. Folet concludes, from his experience in these two cases, that the expectant plan is indicated in the beginning, the local and general condition being carefully watched. A gaseous fluid effusion does not necessarily call for intervention, as it may disappear without causing any complication. Hyperpyrexia, dyspnœa, and small pulse are the symptoms which call for opening of the chest.

In a case seen by Lorain, of Paris, ¹¹_{Feb. 10, '95} signs of hæmothorax appeared on the fifth day, and very soon afterward a secondary hæmorrhage from the internal mammary artery. Absorption of the sanguine effusion took place, however, followed by recovery.

In a case seen by Reverdin, of Geneva, ³_{Oct. 13, '94} great dilatation of the abdomen occurred the day following a revolver wound of the chest. This was at first thought to be peritonitis, but was soon found to be an accumulation of gas in the peritoneum through a perforation in the diaphragm. Operation was attempted, but syncope followed the first application of the bistoury, and Reverdin was obliged to abandon the idea and resort to aspiration. The patient died in three days, and autopsy confirmed the diagnosis.

S. H. House, of Grimsby, ⁶_{June 29, '96} ⁶⁷³_{Aug.} records a case of perforating wound in the right pleura, in a boy of 4 years, due to a fall down stairs upon some broken crockery. The wound was seven inches long across the back, extending through the muscles to the spine at the level of the ninth dorsal vertebra, and on the right side, reaching to the seventh intercostal space, in which there was a wound through the pleura, parallel to the ribs, an inch and a half long, through which air whistled in and out of the pleural cavity. The lung was thoroughly collapsed. The only covering during a period of three hours was a dirty blanket. When brought into hospital, on April 25th, the pulse was very feeble, 152. As quickly as possible all parts of the wound were thoroughly cleansed with 1 in 40 carbolic lotion, care being taken to prevent any entering the pleural cavity. There being very little hæmorrhage, the wound was sewed up at once with silk-worm-gut sutures, drawing the skin over the wound in the pleura and finishing with a firm dressing

of cyanide gauze and alembroth wool. The wound healed by first intention and full recovery followed.

Maydl, of Vienna, ⁵⁷_{June 23, '95} ⁶¹_{Sept. 7} observed a case of abscess following traumatic rupture of the lung in which after fourteen days a dullness appeared in the back at the angle of the scapula, and after two weeks more signs of a large cavity in the lung were evident. The sputum was purulent, abundant, and contained numerous streptococci. The patient's strength rapidly diminished. Maydl resected a rib over the area of dullness, and, since the two layers of the pleura had become adherent, pressed a Paquelin cauterizer through a layer of lung-tissue, some centimetres thick, and opened a cavity, as large as a child's head, filled with fetid fluid, drawing out masses of gangrenous lung-tissue. The largest of these was over one decimetre long and four centimetres broad. Pulmonary œdema followed on two occasions and a catarrhal pneumonia of the sound lung. At the time of report the patient had been for some time without rise of temperature and was walking about. The wound was granulating rapidly and the cavity slowly diminishing. Maydl warns against irrigating such cavities with solutions of thymol, and recommends the physiological salt solution or boric acid.

Nazim Chereffedin, of Constantinople, ²³²_{Aug. 31, '95} in a case of bullet wound of the thorax, noted the interesting point that the ball, instead of penetrating the soft pleural surface, remained in contact with it, gradually forming a depression in the neighboring bone.

Péan, of Paris, ¹¹⁵³_{Oct. 23, '95} states that personal experience and a study of published reports have led him to conclude that equally favorable conditions for surgical intervention do not occur in all affections of the lungs. Wounds caused by contusing bodies, by stabbing and cutting instruments, and by gunshot projectiles of small and medium calibre usually heal well and without causing suppuration or troublesome reaction. The danger which results from such injuries is due not to the injury of the lung-structure itself when the lung is traversed, but rather to the multiplicity and extent of the wounds and to the lesion of important neighboring parts (thoracic wall, large vessels, pericardium, heart, spinal cord). The surgeon should not intervene too hastily in these injuries, either by making a simple exploration or by attempting to extract a projectile which can be seen near the surface.

Llobet ⁹¹_{Mar. 10, '95} employed Postempski's thoracoplastic method of treating diaphragmatic hernia, in a man, due to a sword wound a year previously. Llobet determined to reach the hernia from the thoracic side and made an elliptical incision from the fourth rib, two centimetres from the sternum, obliquely down to the eleventh rib and up again to the fourth rib, following the axillary line;

reflecting the flap (beneath which the hernia lay), he divided the seventh, eighth, and ninth ribs obliquely in front and behind, two centimetres from the lip of the skin incision; on raising this deep flap there escaped from the pleural cavity a quantity of blood-stained serous fluid. The lung collapsed, and the hernial protrusion was recognized as consisting of omentum and transverse colon; the omentum and sac were removed, the gut returned, and the peritoneum and diaphragm sutured with catgut; the long flap was secured by two points of silver-wire suture and the skin-flap and muscle then stitched; after aspiration of the air from the pleural cavity a bandage was applied. After the operation there was threatened collapse and some dyspnoea, and after seven days a large amount of blood-stained serum was evacuated from the thoracic cavity; two drainage-tubes were introduced for forty-eight hours, and the sutures then were replaced. The day after the operation the left lung was expanding down to the lower angle of the scapula; before many days it occupied its normal position, and in three weeks expanded equally with the opposite lung.

Schlatter ²¹⁴_{June 16} had occasion to treat a case of diaphragmatic hernia due to a knife wound, the difficult point of the operation being that the sutures were placed during deep expiration, the wound being otherwise out of reach.

Suturing of the diaphragm for wounds is considered by Ballerini, Rosini, Saraiva, and Manara, of Rome. ⁸³⁹_{No. 2, p. 134, '94;} ⁴⁵¹_{May} Ballerini's case was that of a workman who received an oblique punctured wound, five centimetres long, in the sixth left intercostal space. By resecting the sixth rib the wound was extended, the pleura incised, and a four-centimetre-long wound was discovered, containing omentum, in the diaphragm in the neighborhood of the pericardium. The diaphragmatic wound was sutured, as well as the external wound. Healing was complicated by emphysema, Estlander's operation becoming necessary. Rosini's first case had a wound in the seventh and the second in the eighth left intercostal space. In both wounds the omentum was found, and after its removal the diaphragmatic wound was closed by means of a double row of sutures. Healing took place without any complication in fifteen and eighteen days, respectively. Saraiva's case was similar. The wound was in the eleventh left intercostal space, the omentum also occupying the opening in the diaphragm. Manara's patient was 29 years old, with a wound in the seventh left intercostal space. After resection of the eighth and ninth ribs the wound in the diaphragm was discovered and food found in the pleura. After extending the diaphragmatic wound the one in the stomach was sutured. Though a persistent pleurisy fol-

lowed, complete healing took place, the patient being alive four years after the operation. Sorrentino⁵⁸⁹ also reports two cases of wounds of the diaphragm cured by operation.
Nos. 82, 83, '95

Contusions of the Lung.

John Parmenter, of Buffalo,¹⁷⁰
Oct., '95 publishes an interesting review on contusions of the lungs without wounds of the chest-walls or fracture or dislocation of the ribs,—a subject usually neglected in text-books. The elasticity of the chest-walls permits a considerable incurve and rebound without permanent injury. The elastic lung would also escape were it not, as Gosselin has pointed out, that a person about to be hit instinctively closes his glottis, prevents the escape of air under the impulse of the blow, and makes the lung, for the time being, a solid body. The delicacy of the tissues, and especially of the capillary blood-vessels and air-sacs, together with the fact that the two pleural surfaces are in exact apposition in a normal state, suffice to explain the serious nature of these injuries. Certain complications—chief among which are hæmothorax, pneumothorax, and emphysema—are common in severe cases. The symptoms are those of shock and collapse, with dyspnœa and profuse hæmoptysis. There are sonorous râles, absence of vesicular murmur, with amphoric breathing and metallic tinkling. Recovery follows if the lesions remain aseptic, and they usually do, even if hæmothorax and pneumothorax are present.

In the treatment of the graver forms of contusions of the lungs the shock must be combated by hypodermatic injections of brandy and ether and the application of warmth to the body. For the pain and dyspnœa morphine subcutaneously often acts magically, and may be assisted by the use of cold locally. The hæmorrhage frequently demands immediate attention. Autotransfusion by elevating and bandaging the patient's extremities should be at once employed. If this, with absolute rest in the recumbent position, does not relieve the bleeding, and the dyspnœa and the cardiac embarrassment increase, it is imperative to relieve the condition. With a medium-sized trocar, and using the strictest antiseptic precautions, enough blood may be removed to diminish the pressure. If, as is frequently the case, the cannula become clogged with clotted blood, we must operate as for empyema and turn out the clots. Unfortunately this frequently starts up the hæmorrhage again, and is only to be resorted to when the patient's life is in imminent jeopardy. Pneumothorax can be relieved by paracentesis. Emphysema requires long and deep incisions into the swollen area, followed by judicious pressure. When empyema occurs it must be treated in the usual manner.

Foreign Bodies in the Bronchi.

J. Kobler⁵⁷ studied the anatomical position of the bronchi to explain the greater frequency of foreign bodies in the right than in the left bronchus. In conjunction with von Hovorka he made experiments on bodies hardened by chromic acid, and found that the right bronchus, contrary to the old teaching, always runs more in a line with the trachea than the left, thus confirming the previous work of Aslay and Kocher. Another factor which decides which bronchus the foreign body enters he considers to be the position of the individual at the moment when the aspiration takes place.

George D. Stewart, of New York, presented to the Society of Alumni of Bellevue Hospital¹ July 6, '96 a boy operated upon in Bellevue Hospital on April 15, 1890. On the morning of that day a bean had become lodged in his trachea. At the time of his admission, soon after the accident, the boy had been extremely cyanosed, the respirations had been very slow, and inspiration accompanied by a hoarse cry. Immediate tracheotomy had been performed, and an attempt made to grasp the foreign body with a tracheal forceps. Having failed in this, the incision had been continued farther down, and, because of the aggravation of symptoms which had followed every attempt to use the tracheal forceps, a small catheter had been inserted deeply into the trachea in the hope that it would pass the irregular-shaped obstructing body. Oxygen gas had then been allowed to escape near the end of the catheter. Under this treatment the cyanosis had lessened and the respirations improved. Finally, with a tracheal forceps the bean had been removed from the right bronchus. A tracheotomy tube had then been inserted, and the patient treated in the usual way. The tube had been used for fear of undue swelling or possible infection. It had been removed in three days, and the case had gone on well from that time.

After tracheotomy had been performed in a case of foreign body in the right bronchus of a child, reported by C. E. Crommelin, of Casino, N. S. W.,²⁶⁷ Oct. 15, '94 the wound was held open by means of wire while coughing was induced; but it was not until one hour later that, on a violent cough ensuing, the foreign body—a grain of corn—was finally expelled through the tracheal wound. The latter healed nicely within a month. The grain of corn had been in the bronchus for nearly a fortnight and was quite unaltered. Every means of dislodging the corn had been tried,—by turning the child head downward, etc.

A case of foreign body impacted in the left bronchus for forty-six days, with operation and recovery, is recorded by John H. Morgan, of London.⁶ Sept. 28, '96

MEDIASTINUM.

Mediastinal Abscess.

Hassler³_{Oct. 10, '94} describes the case of a soldier who was very severely injured by a heavily laden sack falling on him while he was lying down. It struck the second rib and caused extreme pain and shock, though the man did not lose consciousness and had no hæmoptysis. For some days afterward he experienced severe pain in respiration and gradually became weak and emaciated. Some eight months later he noticed a tumor the size of a hazel-nut on the right edge of the sternum above the second rib. This grew rapidly, and in a month he could only breathe when lying down, the sense of pressure being very great. The apices of both lungs showed signs of bronchitis in the second degree. An incision was made over the tumor and 400 grammes (12 $\frac{3}{4}$ ounces) of pus removed from above the sternum. At this moment the patient coughed and a jet of pus issued from the sternum by an orifice four millimetres in diameter, a little above the level of the second rib. Hassler increased the size of the incision with the curette so as to permit detersion of the infra-sternal abscess, which descended as far as the middle of the sternum. Abundant irrigation and cauterization with zinc chloride at 10 per cent. were then employed, with tampons of iodoform gauze, but no sutures. Recovery was uneventful. This case illustrates the rôle of traumatism in the production of abscess of the supra-cardiac portion of the anterior mediastinum, symptomatic of tuberculous osteitis of the sternum.

Mediastinal Tumors.

Thiele, of Berlin,³_{Nov. 27, '96} showed to the Berlin Medical Society anatomical specimens obtained from a young woman who for several weeks had experienced a sensation of heaviness in the head and attacks of cough, but without expectoration. There had of late also been increasing dyspnœa and cyanosis of the face. Examination revealed the presence, in the anterior portion of the thorax, of an area of dullness extending from the sternum right and left to the axillary line. All respiratory murmurs were absent in this area and the heart-sounds were perceived as through a layer of cotton. There was no anomaly of the larynx or tracheal artery. A tumor of the mediastinum was diagnosed, and on account of the age of the patient and the rapid evolution it was thought to be a lymphosarcoma. This diagnosis was verified at the necropsy, the patient dying twelve days after admission to the hospital. A case of mediastinal tumor is described by Litten, of Berlin,²²_{Nov. 21, '94} in a man in whom sudden enormous swelling of the

head and neck took place, with great cyanosis and dyspnœa. The swelling of the neck steadily increased in size. The occipital glands were enlarged to the size of hazel-nuts, pupils widely dilated, and there was great enlargement of the superficial veins over the chest and extensive dullness. Right pleuritic effusion occurred and was tapped. Centrifugation of the fluid and microscopical examination showed cells such as described by A. Fränkel in tumors of the pleural cavity,—i.e., of enormous size. Swollen cells, with vesicle-like nuclei and dull appearance. Diagnosis: New growth in anterior mediastinum, starting in the thyroid or the remains of the thymus. There was probably pressure of a soft tumor over the superior vena cava, with formation of collateral blood-channels. In the discussion A. Fränkel said he did not now look upon the cells described as tumor-cells, but as much swollen pleural endothelium.

A. Dardignac, of Paris, ⁹¹_{Sept., '94} describes a case of dermoid cyst of the anterior mediastinum in a soldier, 22 years of age, who, on entering military service, had shown an enlargement of the right chest, with coughing and difficult respiration. The whole right chest was enlarged. After three weeks of expectant treatment 800 grammes (25 ounces) of yellowish liquid were withdrawn by aspiration. An examination showed that the fluid was not purulent. Improvement followed at once, and a second aspiration ten days later gave issue to 500 grammes (16 ounces) of a similar fluid. Immediate and more marked improvement followed and persisted.

Three years later he again applied for treatment, with a swelling of the right side of the chest, most prominent in the mammary region, and rounded and resisting. After excising six centimetres of the fourth rib, an aspirator was introduced into the fluctuating portion, and a thick, turbid, greenish fluid was withdrawn, not containing pus or blood, but mixed with particles resembling saffron-colored grains of rice. It was impossible to tell whether the sac was intra- or extra- pleural. Its capacity was estimated at 1800 grammes (58 ounces). Irrigation brought out some skin, hair, and sebaceous matter, proving the tumor to be a sebaceous cyst. As an extensive costal resection would have been required to remove this cyst, and as the sac-wall was adherent on all sides, an attempt to secure the obliteration of the cavity by exciting an inflammation was made and tincture of iodine and iodoform gauze were introduced. The patient had a slow convalescence, attended with some fever. Four months after the operation a small retrocosto-sternal cavity persisted, with a fistula twelve to fourteen centimetres deep, which remained as long as the patient was under observation, although it decreased somewhat in

dimension. The patient gained in weight and seemed in perfect health. The author has collected 23 similar cases from literature.

HEART AND PERICARDIUM.

Pericarditis.

Surgical intervention in pericarditis is so rare as to render the case operated by Eiselsberg, of Vienna, ⁸ Jan., '96; ⁹⁹ May 2 of especial interest. The case was that of a boy of 17 years, who developed a purulent pericarditis after a stab wound of the pericardium. Puncture of the pericardium having been performed several times without relief, the surgeon decided upon incision. The cartilage of the fourth rib on the left was resected and the thickened pericardium exposed. After exploratory puncture it was opened by a transverse incision four centimetres in length and two litres (quarts) of a sero-purulent fluid were evacuated. The cavity was washed out with warm salicylated water, the borders of the pericardial incision stitched to those of the wound, and two drainage-tubes inserted. Complete recovery took place in four weeks. Examination of the exudate showed the presence of an organism resembling the colon bacillus, but it was, of course, impossible to say whether its presence was primary or the infection took place through the wound. The writer insists upon the importance of suturing the pericardium to the lips of the wound, the advantages of which procedure in preventing infection of the pleura are evident.

Wounds of the Heart and Pericardium.

From experiments on dogs del Vecchio, of Rome, ⁵⁸⁹ Sept. 16, '96 believes that suture of the heart is possible in case of wounds, and he proposes the following procedure in the human subject: Two longitudinal incisions to be made from the lower border of the third rib to the upper border of the seventh,—the one along the margin of the sternum, the other five to ten millimetres inside the nipple line; these incisions to be joined by an horizontal one made in the fourth intercostal space. The fourth, fifth, and sixth ribs and cartilages to be divided and the outer, cutaneous flaps turned up. The pleura to be separated and pushed on one side with the finger, exposing the pericardium, which is incised longitudinally. The wound to be then united by interrupted sutures.

C. H. Mastin, of Mobile, ⁹ June 29, '96 describes the case of a man, 32 years of age, who was shot from an ambush. The bullet, a 38-calibre, entered the rear of the chest on the left side just below and to the outer side of the angle of the scapula, at which point it entered the chest between the seventh and eighth ribs. It

passed through the entire chest and emerged from the fourth intercostal space two and one-half inches from the midsternal line. Upon this anatomical location it is not possible for the heart to have escaped direct penetration. The patient fully recovered.

H. C. Dalton, of St. Louis, ⁹⁶_{Feb., '96} reports a most remarkable case of wound of the pericardium, followed by recovery. The patient, aged 22 years, was admitted to the hospital one hour after the injury. His symptoms, on admission, were very slight, but ten hours later his temperature rose to 101° F. (38.3° C.), pulse to 112, and respiration to 40. The entire left side had become dull. An incision eight inches long was made over and parallel with the fourth rib, and six inches of the rib resected. The bleeding intercostal artery was ligated. The pleural cavity was found to be filled with fluid and clotted blood. There was a wound in the pericardium two inches in length, which was sutured with much difficulty, owing to the movements of the heart. The pleural cavity was irrigated with hot water and the wound closed. The condition of the patient was very critical during the operation. His recovery was rapid and uninterrupted. This case is worthy of note, since almost no reference can be found in the text-books on surgery relative to the treatment of such wounds. Dalton states that he had no precedent to guide him, no authority to uphold him in attempting to sew up a wound over a heart that was beating 140 a minute. The result in this case goes to prove the method adopted a good one.

Paracentesis of the pericardium is but rarely performed, and there is some difference of opinion as to its gravity and value. Percy Kidd, of London, ²_{Feb. 2, '95} obtained great relief from its employment in a case of granular kidney, cardiac dilatation, and uræmic asthma, life being prolonged several weeks. The author adopts the following conclusions of Samuel West ²⁰⁷²_{'83}: 1. That the operation is not only justifiable, but may be safely undertaken with ordinary precautions. 2. The most suitable place is in the fifth left intercostal space, one inch from the edge of the sternum; but if the pleura be adherent the puncture may safely be made farther out and even in the sixth space. 3. The instruments should be a trocar and cannula, with or without aspirations. 4. The operation may be performed not only in effusions of rheumatic or primary origins, but in those of the later stages of general dropsy, if the fluid in the pericardium be adding to the cardiac difficulty. These conclusions were not indorsed by all the members of the society at which Kidd's paper was discussed, Sansom, Sheild, and Carr doubting its expediency in all cases. According to West, ²_{Mar. 23, '95} the improvement which followed the removal of only a few minims of

fluid could not be referred to any relief given to the pressure on the heart. It must fall into the curious category of cases in which a single dry puncture has been followed by improvement without any obvious cause. J. W. Cousins, however, ²_{Apr. 27, '95} believes that in such case, although a very little fluid may appear externally, still the exudation escapes through the puncture into the cellular tissue of the mediastinum, and this fortunate occurrence is accelerated by the cardiac movements. Gordon Sharp ²_{May 18, '95} suggests that the explanation of the disappearance of fluid from the serous cavities under the circumstances named is due to a nervous cause in the shape of a powerful impression made on the nervous system by even the thrusting in of a needle in the neighborhood of a vital organ. Be this as it may, there can be no doubt as to the disappearance of considerable collections of fluid after puncture, and it teaches the lesson that tapping near a vital organ or organs is a more serious operation than is generally taught. He has seen a collection of fluid in the peritoneal cavity, that had resisted the most heroic medicinal treatment, disappear after a trocar and cannula had been thrust in and only about a teaspoonful of fluid withdrawn. Delorme and Mignon, of Val-de-Grâce, ⁹¹_{Oct. 10, '95} devote a quite lengthy article to puncture and incision of the pericardium, unfinished at the time of this report.

Direct Cardiac Stimulation.

Sloan presented to the Edinburgh Medical Society ²_{Dec. 15, '94} a case of endocarditis and pericarditis, with effusion, in which accidental tapping of the right ventricle after apparent death was followed by recovery. The patient was a young woman, 19 years of age, who had had three previous attacks of acute rheumatism. The fourth was preceded by a sharp attack of erysipelas, from which she was recovering when the rheumatic seizure occurred. The patient seemed to be *in articulo mortis*, when Sloan suddenly introduced the trocar of an aspirator and drew off ten ounces of blood, apparently from the right ventricle. The patient lived and improvement began. She is now fairly well.

Some cases of interest in this line of cardiac stimulation when all common means had failed came under the observation of L. P. Clark, of Middletown, ⁹⁹_{Apr. 18, '95} while interne in a New York hospital.

Within a few weeks of each other three cases of delirium tremens presented an opportunity to try cardiac injections, all three being cases in which all stimulants—such as digitalis, strophanthus, nitroglycerin, etc.—had failed to ward off a fast-approaching cardiac paralysis.

On being called to the first case, as was then supposed for

the last time, he found that hypodermatic injections of stimulants would no longer revive the heart's feeble motion. It was thought probable that if stimulants could be injected directly into the heart-muscle the much needed stimulation could be obtained. Accordingly, $\frac{1}{16}$ grain of sulphate of strychnine was injected by means of a long needle-syringe. The immediate result of its administration was to slow down the heart's action without changing its irregular rhythm. In fifteen or twenty minutes this, too, improved. After one more injection of $\frac{1}{20}$ grain (0.003 gramme) in one hour, the heart was beating about 100 per minute and quite regularly. This case eventually recovered from the attack and was discharged in five days. The case, although the history is somewhat meagre in details, showed a beneficial result from cardiac injections of stimulants. The immediate effect—the heart's improved action—seems to have been due, first, to the puncture, and, secondly, to the fact that the drug sustained the heart until the alcoholic narcosis had lessened its hold upon the patient. The second case was similar to the foregoing, but was not quite so severe and required only one injection.

In the third case the injections were withheld in deference to the wish of the visiting physician, who insisted upon the use of other cardiac stimulation until the patient's condition became very critical. The pulse was imperceptible at the wrist, and respiration was only noticeable at intervals of ten or fifteen seconds. At last the injection of ammonia was made into the heart-muscle, but no change followed this first administration, and the second was given in eight or ten minutes. The patient died in a few minutes after the last injection. Probably this last case had become so moribund at the time of the injection that no remedy could have kept him alive.

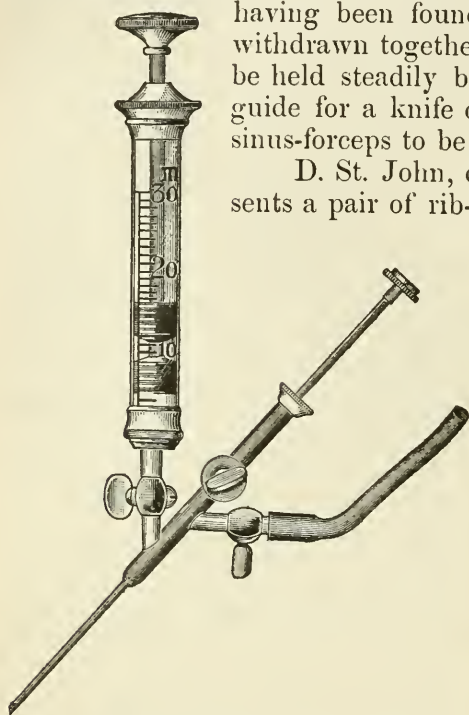
INSTRUMENTS.

William D. Huggard, of Davos Platz, ²_{Nov. 23, '96} presents a paracentesis needle which he has used for some years ²⁰⁷³₉₆ and which is illustrated on next page. The instrument has one arm for an hypodermatic syringe and another arm to which India-rubber tubing can be attached; the central tube carries a fine needle. The advantage of the little contrivance is that a very small and not alarming instrument is used for the exploratory puncture, and that fluid, if found, can be removed at once.

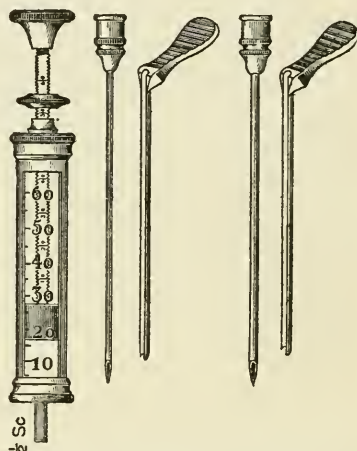
A. W. Prichard, of Bristol, ⁶_{Aug. 31, '96} having experienced in his own operations and witnessed in those of others sometimes a difficulty in cutting into an abscess which has been proved to exist by the ordinary exploring needle, devised a fine director, to which a suitable handle is attached, fitted on to an exploring needle. The

director very slightly increases the thickness of the needle. The instrument is used with the director encasing the needle; pus having been found, the syringe and needle are withdrawn together, and the director, which can be held steadily by the firm handle, serves as a guide for a knife or, in dangerous regions, for a sinus-forceps to be run down the groove.

D. St. John, of Hackensack, N. J., ⁵⁹Feb. 9, '96 presents a pair of rib-shears in which he has aimed

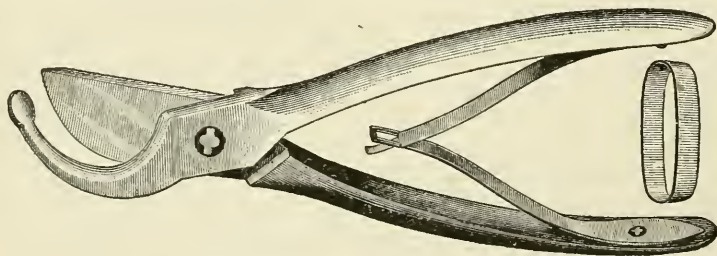


HYPODERMATIC PARACENTESIS NEEDLE.
(HUGGARD.)
British Medical Journal.



EXPLORING NEEDLE AND DIRECTOR.
(PRICHARD.)
Lancet.

to combine strength, ease of cutting, and safety in a simple and perfectly aseptic instrument. The lower blade is curved to more



RIB-SHEARS. (ST. JOHN.)
Medical Record.

closely apply itself to the rib to be resected and does not impinge on the adjoining rib. The end is probe-pointed; so that the lung and pleura are not endangered in its introduction.

ABDOMINAL SURGERY.

BY THE CENTRAL EDITORIAL STAFF.

SUBMITTED FOR COMMENTATION TO
WILLIAM T. BULL, M.D., AND WILLIAM B. COLEY, M.D.,
ASSOCIATE EDITORS,
NEW YORK.

SURGERY OF THE STOMACH.

Gastric Ulcer.

Lambotte¹¹⁵³_{June 22, '95} recommends surgical intervention in all cases of ulcer in which medical treatment is insufficient or in which relapses demonstrate that the cure was not complete, and also in cases in which gastric or intestinal hæmorrhages occur frequently, causing progressive weakening of the general condition. The possibility of a portion of the contents of the stomach escaping into the peritoneum during the operation has been advanced, but this danger is certainly much less than that resulting from incisions of biliary, tubal, pelvic, or renal abscesses. Lambotte also subjects his patients, several days before the operation, to a treatment intended to render the stomach aseptic; with this end in view, he places them under a diet composed exclusively of sterilized food, and also practices, at intervals, gastric lavage with a sterilized alkaline solution.

Ewald, of Berlin,³_{Nov. 28, '94} thinks that, in the case of a simple ulcer of the stomach, surgical intervention should not be resorted to except as a late measure. It is known that 85 per cent. of these ulcers are cured without operation; it is therefore well to wait unless the patient experiences really unbearable pain, although fully recognizing the fact that the results of surgical intervention in cases of simple ulcer are satisfactory, generally speaking.

Direct resection of the ulcerated gastric portion gives 50 per cent. of cures. Surgical treatment of cicatricial stricture of the pylorus is followed by 70 per cent. of recoveries, when pyloroplasty by the method of Mikulicz is resorted to; by 74 per cent. with pylorotomy, and by 85 per cent. with gastrostomy. In round numbers, these operations give a total of at least 60 per cent. of

cures. Surgical intervention should thus be indicated in cases of simple ulcer giving rise to serious symptoms.

A. V. Atherton, of Toronto, ⁵⁹_{Jan. 5, '96} reports three cases in which he performed laparotomy for perforated gastric ulcer, two of which terminated successfully, and insists upon the fact that, when the diagnosis is reasonably certain, a laparotomy should be done, and that with the least possible delay. As far as he had been able to glean from the reported cases, none had ended in recovery when twenty-four hours or more had elapsed between the onset of the symptoms and the operation of gastrorrhaphy. He draws attention to pain localized at the top of the shoulder in two of the cases reported, and quotes Gilford, ⁶_{June 2} who considers pain in the top of both shoulders as a prominent symptom.

William Ewart and W. H. Bennett, of London, ⁶_{Nov. 17, '94} report a successful case of laparotomy for perforating ulcer with subphrenic pneumothorax. The rarity of recorded instances in which success attended surgical treatment under these conditions gives the case an unusual degree of interest.

In a case treated by Lundie, of Edinburgh, ²_{Jan. 26, '95} in which the perforation was larger than one of the eyelet-holes of a shoe, extreme collapse followed the washing out of the organ after the perforation had been stitched up. The patient quickly rallied, however, when put to bed. The operation was performed ten hours after the accident, and there were already signs of general peritonitis. After operation there was no further trouble from peritonitis.

Küster ³³⁶_{No. 51, '94} reports a second case of gastric ulcer successfully treated by incision of the stomach, thermic cauterization, and gastro-enterostomy. The patient, when discharged (at the end of six weeks), was free from pain in the stomach and able to take both solid and fluid food without discomfort. Two months later he was still in good health and had increased considerably in weight.

Gilbert Barling, of Birmingham, ²_{June 15, '95} condemns the proposal to excise gastric ulcer which had not perforated, but considers Küster's operation—open the anterior wall of the stomach, apply actual cautery, and then perform gastro-enterostomy—a distinct advance in the surgery of the stomach.

Pearce Gould, of London, ²_{Oct. 20, '94} states that 85 per cent. of gastric ulcers make a perfect recovery without any operative procedures, and deprecates any operation with a view to obviating the occurrence of perforation. The operation should not be done while the patient is suffering from the first shock of the perforation, but as soon as reaction has set in. As regards the operation

itself, the pain is no sure guide to the seat of the ulcer. The incision should be made in the median line, but it can, if necessary, be enlarged transversely. The cleansing of the peritoneum is the most important step. For this purpose irrigation with a sterilized salt solution at a temperature of from 110° to 112° F. (43.3° to 44.4° C.) is preferred.

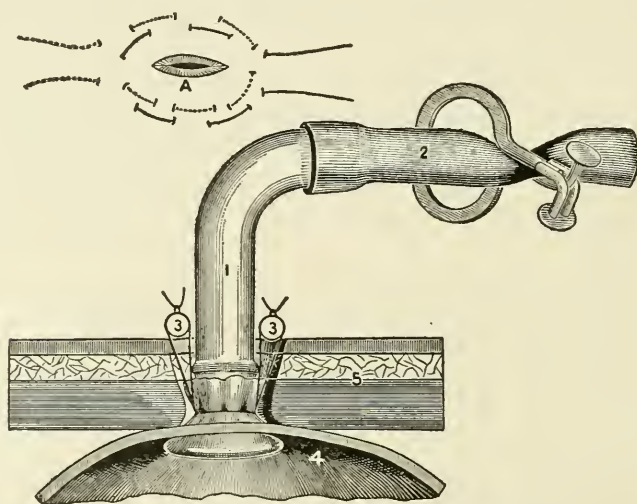
When possible, the opening in the stomach should be closed with Lembert sutures. If it be impossible to close the opening on account of its location or wide-spread induration, it may be secured to the abdominal incision, but in other cases a drainage-tube should be introduced and packed around with iodoform gauze. Drainage of the peritoneum should be practiced in all cases in which peritonitis is marked; the tube is best placed in a separate incision above the pubes.

In a case treated by Victor Horsley, of London, ²_{July 18, '96} fatal termination was due to the formation of abscesses, one of which had extended backward round the liver and opened through an aperture in the diaphragm into the base of the left lung. The progress of the case had been remarkably good during the first twelve days.

R. H. Bouchier Nicholson, of Hull, ²_{Dec. 22, '94} attributes the successful results obtained by him, in a case of perforating ulcer treated by laparotomy, to (1) being enabled to operate soon after the perforation occurred (three hours); (2) thorough washing out of the peritoneal cavity with an aseptic and non-irritating fluid,—namely, boiled water at 110° F. (43.3° C.); (3) drainage; (4) the two sets of stitches fixing the infolded stomach; (5) the insistence on rectal feeding being continued for a long period; (6) favorable situation of perforation, thereby enabling the operation to be quickly completed.

F. T. Paul, of Liverpool, ¹⁸⁷_{July, '96} performed gastrostomy in one stage in a case of perforation occurring in a woman, aged 31, who had suffered from gastric ulcer for several years. The operation was performed nine hours after the perforation had taken place. The ulcer was imperfectly closed with sutures, and, in order to avoid further leakage, a glass tube was ligatured into the front wall of the stomach, in the manner shown on next page. The peritoneal cavity was well washed out, but not drained. The patient rallied well. For the first week rectal feeding was mainly relied on, but plenty of warm water by the mouth was allowed; subsequently food was given, almost entirely by the mouth. The gastrostomy-tube was retained until December 27th, and during all this time no leakage took place around it. A fortnight after its removal the fistula closed. Before the operation the patient

was chlorotic, with loud hæmic bruits; since, she had entirely recovered from dyspepsia, had a good color, and had gained twenty-three pounds in weight. Paul expresses the opinion that excision of the ulcer gains no support from the cases recorded by English surgeons; and if simple suture is sufficient, the much more severe operation of excision ought to be abandoned. When taken at the right time, in a fairly good subject and with an accessible ulcer, laparotomy for perforated gastric ulcer will be a very successful operation; and the only reason why there are so few recoveries reported up to the present is that the medical world has not yet fully recognized that success depends mainly upon



GASTROSTOMY IN ONE STAGE. (F. T. PAUL.)

A. Method of passing the ligatures in the stomach. 1. Glass tube. 2. Rubber tube with clip. 3, 3. Sectional view of glass rods over which the ligatures are tied. 4. Interior of the stomach. 5. Abdominal wall.

Liverpool Medico-Chirurgical Journal.

early operation. He strongly supports the opinion of William Williams, of Liverpool, to the effect that the original cause of gastric ulcer may, in many cases, be traced to the use of corsets.

L. A. Dunn, of London, ²_{MAY 18, '95} performed laparotomy in two cases of gastric ulcer,—one in a girl of 15 years, the other in a woman of 28. The first case was followed by recovery, though perforation had occurred; but the second patient succumbed in four days. The necropsy revealed neither peritonitis nor extravasation of gastric contents. A large gastric ulcer was found, through the floor of which, now that post-mortem digestion had taken place, the gastric contents could be made to pass on squeezing the sides. The wound was quite healthy and healing. This last case

showed the difficulty of diagnosing when an ulcer had perforated. It was thought that perforation had here taken place before the operation, but it had not.

P. Michaux, ⁸²⁷_{Oct. 24, '94} in a case of perforating ulcer, tried to suture the edges of the perforation, but the tissues were too friable. As it was out of the question to excise the ulcer, there was nothing to do but to inclose the perforation in the bottom of a fold made on the anterior surface of the stomach; occlusion was assured by a double row of Lembert sutures very carefully inserted at equal distances. The incision was closed, except at the lower part, through which the author passed an iodoformed pledget as far as the sutured ulcer. Very satisfactory results followed.

A case described by A. Bilton Pollard, of London, ²_{July 6, '95} is an instance of the striking success which may attend the surgical treatment of perforated gastric ulcer. The operation was commenced seven and one-half hours after the perforation occurred. The time at which the perforation happened was fortunate. It took place two and one-half hours after the smallest meal of the day,—tea,—which did not include any indigestible food. The diagnosis of the condition was simple. It rested on the sudden onset and severity of the symptoms, the situation of the pain, and the presence of free gas in the peritoneal cavity. The operation was unattended with difficulty after a transverse cut through the upper part of the left rectus muscle had been added to the original median incision. In a paper giving the details of two cases operated by laparotomy, one of which terminated successfully, R. F. Jowers, of Sussex, ⁶_{Mar. 2, '95} publishes twenty-five cases gathered from English literature.

Although unsuccessful, a case operated on by Russell Steele, of West Herts, ⁶_{Aug. 3, '95} appeared to him to be of particular interest and worthy of publication for the following reasons: 1. Although extensive ulceration was discovered, the patient had never been so seriously ill as to consult a medical man, and, according to her statements and those of her friends, there had never been hæmatemesis or melæna at any time. 2. The ill-defined nature of the physical signs on admission and the fact of the chief signs on examination pointing to some lesion in the lower part of the abdomen led him, in spite of the history of gastric trouble, to explore this region first. 3. A great point of interest and importance was the presence of another ulcer on the posterior wall of the stomach. He thinks it probable that the adhesion between it and the pancreas may have been broken down during the necessary manipulations for suturing the ulcer on the anterior wall.

Keen ¹⁴⁴_{Nov., '94} states that in performing laparotomy, if no per-

foration be present, the seat of the ulcer can sometimes be located by the presence of a circumscribed patch of peritonitis, which corresponds to the situation of the ulcer in the viscus.

In a case of A. Cahn's, ⁴July 15, '95, violent cardialgia, leading to a cachexia that menaced the life of the patient, was considered an indication for operation, though signs of pyloric stricture were not present.

Curt Pariser, ⁶⁹July 11, '95, has tabulated 43 cases with 10 cures, in which operative measures were taken after perforation of a gastric ulcer. The 10 cures were effected by the following surgeons: Taylor, Heusner Kriege, Morse, Maclaren, Michaud, Roux, Nicholson, Morris, Hastings-Gilford, and Bennet. The ulcer was situated twice on the lesser curvature, six times on the posterior wall, and twenty-two times on the anterior wall of the stomach. Eighty-six per cent. were in women. The operation should be performed within at least ten hours after the perforation has taken place. Kirkpatrick, of Montreal, ²⁸²Mar., '95, adds one case; K. Schuchardt, of Stettin, ³³⁶July 6, '95, two, and J. Hopkins Walters ⁶Feb. 23, '95, one case of successful operation after perforation.

Ewald, of Berlin, ³Nov. 28, '94, states that it is a mistake to consider exploratory laparotomy as a perfectly innocent operation. These laparotomies are often followed by cicatricial adhesions between the stomach and the abdominal walls, which may form the initial point of serious accidents. In a general way, it must be recognized that surgical intervention with regard to the stomach requires both very great ability and great presence of mind in the operator.

According to Doyen, of Reims, ²⁰⁶⁰'95, the pain in nearly all painful diseases of the stomach is localized in the pylorus. Dilation of the stomach arises, in the absence of any mechanical cause, from spasmodic contractions of the pylorus. Seven patients who suffered from severe dyspepsia and fourteen who were the subjects of gastric ulcer without stenosis were completely cured by gastro-enterostomy.

Doubtless the brilliant interventions practiced by Doyen have generally given good results, but he will probably convince physicians with difficulty that gastro-enterostomy should become a mode of treatment in dyspepsia.

Cancer of the Stomach.

The surgical treatment of gastric cancer, according to Rosenheim, of Berlin, ⁴Feb. 25, '95; ¹⁵Apr., resolves itself into that of the pylorus and neighboring parts,—resection with removal of the diseased material, or gastro-enterostomy, the establishment of a fistulous communica-

tion between the stomach and the intestines. The mortality, according to Guinard, in 153 resections was 62 per cent.; and, according to Lebœuf, in 108 patients, 58 per cent. For gastro-enterostomy Guinard gives a mortality of 31 per cent. in 105 cases; Rockwitz quotes a much lower figure,—12.5 per cent.; while Eugen Hahn is still more favorable. In all these the special technical training of the operator is a factor, and other conditions which necessitate the operation exercise a considerable influence. From the statistics resection is the more perilous procedure, especially where it lasts several hours. The cases should be carefully chosen. The patient must be capable of standing the operation, and the conditions in the stomach suitable. As contra-indications may be mentioned extension of the growth over half the stomach, extensive adhesions with the liver and pancreas, implication of the mesentery, and especially metastases, and infiltration of the lymph-glands. Much depends upon an early diagnosis, and for this we have no certain sign. A combination of all the signs gives the most satisfactory guide, but in many cases it is not possible to foretell the condition without an exploratory incision. Where it is not possible to operate much may be done by washing out the stomach regularly and treating the symptoms, or by a palliative operation. Many patients of Rosenheim, so treated, increased in weight and lived longer. The removal of local irritation slows materially the rate of growth, and the patient's nutrition improves. The motor function may be quite maintained after resection of the pylorus; in gastro-enterostomy it remains incomplete, though the patient may be free from all discomfort. These palliative operations will probably be more frequently carried out, as in trained hands they are almost without danger.

At the Berlin Surgical Congress ³³⁶ July 6, '95 Mikulicz, of Breslau, reported 103 operations on the stomach with 23 deaths; 13 of the latter in 35 patients happened during the first ten years, whilst in the last three years and a half, out of 68 patients, 10 only died. The improvements in surgical methods are thus shown. The non-success of operations for carcinoma is ascribed to the weakness of the patient, and to improve the general state the author uses subcutaneous injections of saline solutions. When the practicability of an operation is doubtful he recommends that a very short abdominal incision, from 2 to 4 centimetres (from $\frac{3}{4}$ to $1\frac{1}{2}$ inches) in length, be made, so that one finger may be introduced and the abdominal organs explored. If an operation is inadvisable, the small wound can easily be closed by sutures. In the series reported the patients lived, on an average, for six months after gastro-enterostomy, but for a year and a half after resection. He

accordingly prefers the latter operation, of course, except where the lymphatic glands and the peritoneum are attacked. The operative procedures could scarcely be improved, but an earlier diagnosis might be the means of saving many cases.

Von Eiselsberg recommended the excision of the growth and the closing of the ends both of the stomach and of the duodenum by sutures. This done, a regular gastro-enterostomy follows and the chyme easily passes through the new aperture.

Montaz, of Grenoble, ⁹⁶_{Mar., '95} reports 6 gastrectomies with 3 deaths, 6 successful gastrotomies done for cancer of the cardiac end when complete ablation was quite impossible, and 10 gastro-enterostomies with 3 deaths. Two enterostomies were performed upon patients suffering from extensive involvement of the stomach in cancerous growth, and in whom alimentation had become impossible. The jejunum was identified, and an opening in its walls was made just as in a gastrostomy. Through this the patients were fed, and both of them lived some months. All the deaths were due to operative collapse.

Kocher, of Berne, ⁶⁹_{Nos. 16, 18, '95} gives some new cases of cancer of the stomach treated by his method, which, as is known, consists in isolating the malignant tumor between two forceps with long jaws, and making two incisions,—one gastric, the other duodenal,—suturing the stomach wound and inserting the duodenal wound into an opening made in the posterior wall of the stomach.

This operation is called by him pylorotomy combined with gastro-enterostomy. The author has used the method in twelve cases, none later than eight months previous to the time of report, with one death. In the latter case there was a tumor extending to the lower wall of the liver, and the operation was accompanied by an accident which necessitated the ligature of the hepatic artery. Necrosis of the liver resulted, causing the death of the patient. All the other patients are still living. In one operated upon about eight months previously, not the slightest morbid symptom has ever occurred, and the author considers him cured. Another patient, after nineteen or twenty months, now has cancer of the rectum. A single case of relapse *in loco* occurred after sixteen months, for which Kocher practiced gastro-jejunostomy, which up to the present time has shown good results. Seven new cases not yet published, operated upon within eight months, have so far not shown evidences of relapse.

Pachon, of Paris, ¹⁴_{Dec. 19, '94} performed total extirpation of the stomach in a cat and observed that all the functions of the animal continued to be performed regularly; it digests its food very well with the exception of raw meat; the digestion of cooked meat,

however, is perfect and complete. There is diminished inclination to take food and the animal seems fatigued and depressed after its ingestion. Extirpation of the stomach has thus far been mainly practiced upon dogs, but the anatomical arrangement of the organ prevents its entire removal. In the cat more than one centimetre of the œsophagus and the duodenum beyond the cardia and pylorus may be removed. The two extremities thus formed were found in Pachon's experiment to be thoroughly united after death by inanition, which took place six months after the operation. The disinclination to eat had so increased that the animal had to be forced to take food. Langenbuch, of Berlin,⁶⁹⁸⁰ Dec. 27, '94; Mar. 15, '95 reported two instances in which he performed the operation in the human subject, one terminating successfully. This was in a woman, 58 years of age, in whom the classical symptoms of cancer of the stomach with tumor of the hypogastrium were present. No metastases having been found after the abdominal wall had been opened, the stomach was drawn out and detached at its pyloric and cardiac extremities, the portion removed representing seven-eighths of the stomach. The pylorus was stitched to the remains of the cardiac orifice, making a cavity about the size of a hen's egg. Fearing lest the sutures might give way, the new stomach was fixed in the abdominal wound by passing behind it a piece of iodoform gauze; the rest of the abdominal wound was closed. The operation lasted one and one-half hours. In the evening the patient received a little milk; the next day there was slight fever. On the third day meat was given. Convalescence was rapid and cure was accomplished in three weeks. In the second case the sutures gave way, causing localized peritonitis and, subsequently, death from inanition. In the third the sutures also gave way, owing to the traction induced by coughing, the patient being affected with bronchitis.

R. W. Stewart, of Pittsburgh,¹⁹^{Oct. 9, '95} performed gastro-duodenotomy in a case of cancer of the pylorus, using for the purpose a Murphy button. At the time of the operation, June 5th, the patient's weakened condition precluded a pylorotomy. After the operation the patient rallied well; in one week he was eating solid food, and on the thirteenth day passed the button. Soon afterward he was discharged from the hospital. On July 20th the patient died, and there was seen to be almost complete occlusion of the pylorus at the point of anastomosis. The most important point was the marked diminution in the calibre of the anastomotic opening as compared with the size of the original button.

In a case of carcinoma in the region of the pylorus, reported by Mathieu and Quénu,¹⁴^{May 12, '95} an exploratory incision caused com-

plete disappearance of the intense local pain from which the patient was suffering. Quénu, in another paper,⁹¹_{Oct., '95;}²_{Nov. 16} states that, in cases of cancer affecting the pyloric region, he would perform an exploratory laparotomy with the object of making out with precision the seat and nature of the disease and of determining whether or not the new growth be amenable to a radical operation. If the pyloric cancer could not be directly attacked and removed by operation, he would perform gastro-enterostomy. If, on the other hand, there were good prospects of removing the whole of the diseased structures, he would also establish an anastomosis between the stomach and jejunum, and, after an interval of from ten to fifteen days, perform pylorectomy. The removal of cancer of the pylorus in two stages presents, it is maintained, important advantages. In the first place, by a preliminary gastro-enterostomy, the duration of the subsequent operation of pylorectomy is much shortened, and, in the second place, when the patient has been much enfeebled through inanition, the first operation permits of speedy renewal of vigor by nourishment, and consequently favors more resistance against the immediate results of the serious operation of gastrectomy. The author has used Murphy's button and recommends it to his colleagues.

Klemm²¹_{No. 49, '94} states that those cases only should be recommended for resection of the pylorus where the tumor is freely movable and there is no metastatic involvement. If these conditions are not present the formation of a fistula between the stomach and jejunum is indicated. The operation should not be delayed until the patient is almost dead from inanition,—*i.e.*, as a last result.

A case recorded by W. H. Carthew Davey, of Liverpool,⁶_{July 13, '96} is of interest as being the only one known to the author of survival for so long a period after operation for cancer of the pylorus. This case, which was briefly alluded to in the ANNUAL at the time of the first report, in 1890 (see issue of 1891, vol. iii, C-26), was operated on by H. G. Rawdon, pylorectomy being performed and Senn's decalcified-bone plates used. After the operation the man remained perfectly well for three years and a half, with no dyspepsia or gastric trouble whatsoever, and could take any kind of food without discomfort, when, in June, 1893,—three years and eight months after the operation,—he was prostrated with an attack of hæmatemesis. The hæmorrhage soon ceased with the usual remedies, and he apparently recovered perfectly. There was no tumor or sign of any fresh growth to be felt at the epigastrium. This attack of hæmorrhage was the first evidence of recurrence. Some six months after the hæmorrhage symptoms of dyspepsia

presented themselves, and a small tumor could be felt just beneath the old cicatrix in the skin. This gradually increased in size. He began to lose flesh, and it was now evident that the disease was making rapid progress, for he was no longer able to sit up, and, taking to his bed, he gradually sank and died from suppurative meningitis and exhaustion, on December 21, 1894. The necropsy showed a large excavating ulcer, with indurated edges and sloughy base, infiltrating nearly the whole of the mucous membrane of the stomach. The stomach was adherent to the liver, pancreas, and diaphragm,—in fact, these organs had to be removed with the stomach, as the adhesions were so firm that it was quite impossible to dissect it off without tearing. There were no secondary growths in any of the organs. The disease appeared to be quite localized in the stomach. The suppurative meningitis was no doubt due to septic embolism from the sloughing mass in the stomach. Microscopical examination showed the cancerous nature of the growth.

Porges showed to the Vienna Medical Society ⁵⁷_{Oct. 27, '95} a patient from whom Mayal had removed the stomach, five years previously, for carcinoma. The part removed was eighteen centimetres long and seventeen centimetres broad. A small portion of the cardiac end was left and finally attached by sutures to the duodenum. Microscopical examination of the tumor removed showed it to be a scirrhous. The patient weighed 54 kilogrammes (119 pounds) before the operation, and at the time of the report weighed 80 kilogrammes (176 pounds). He is able to digest any kind of food and follow his employment. The cicatrix is still prominent, with a tendency to form a hernia where the left rectus abdominis was cut.

Gastric Operations.

Gastrotomy.—Frank's method seems to be acquiring considerable support. The abdominal cavity is opened by a small incision and as large a portion as possible of the stomach is drawn out through the opening made. The base of the projecting mass is then fixed to the peritoneal edges of the wound; its free outer portion is passed under a bridge of the neighboring integument which has been raised for the purpose, and finally brought out through a second wound made over the margin of the ribs, to the edges of which the gastric walls are fixed by a second row of sutures. The operation does away with the discomfort caused by the severe eczema and ulceration generally observed in other operations.

H. Lindner ⁴_{No. 8, '96} reports nine cases in which he has used this plan with the most satisfactory results. There was but one death, and that in a patient who was extremely debilitated before it was

undertaken. In the others the wounds healed quickly and well, and there was no subsequent overflow of food or gastric juice. Picque¹⁴_{Feb. 10, '95} reported a successful case operated by Monnier, but objects to the time required to perform the operation and to the fact that two sittings are necessary. In urgent cases the author thought that rapid gastrotomy should be performed, Frank's operation being indicated in comparatively robust subjects when there was no urgency. Michaux¹⁴_{Feb. 10, '95} having removed the ligatures on the tenth in a case of his own, hernia of the stomach followed a severe paroxysm of coughing. Schwartz⁵⁵_{Dec. 15, '94} after a series of five operations, considers the secondary incision, found difficult to perform by some surgeons, as quite simple. To simplify it Berger advises that a thread be passed through the gastric wall; the latter being raised by drawing upon the thread, the incision can easily be kept within easy reach. Le Dentu⁵⁵_{Dec. 15, '94} considers the forty-eight hours' delay a great objection to the operation, owing to the interference with proper nourishment.

Villar³_{Nov. 28, '94}; ¹⁸⁸_{June 30, '95} proposed a modification of Frank's method having for its object the strengthening of the attachment of the gastric fold, which in Frank's method is obtained by means of a sero-serous suture. Villar includes in the suture not only the parietal peritoneum, but also the musculo-aponeurotic tissues. A sort of canal simulating an œsophagus is thus formed which may be closed at will, and the stomach is brought and held close to the musculo-aponeurotic parietes. A case was reported in which excellent results were thus obtained.

An interesting case of gastrostomy for foreign bodies is recorded by Mayo Robson.⁹⁹_{Feb. 7, '95} The patient was 10 years of age and had been admitted into the hospital for gastric symptoms which were not of a very definite nature. For eight months the symptoms had persisted without yielding to any treatment. However, while under observation in the hospital, the patient vomited a nail. On opening the stomach 152 nails of various dimensions, 3 collar-studs, 1 safety-pin, and 1 sewing-needle were found in the cavity. The wound healed by first intention, the patient making a complete recovery. A successful gastrotomy for the removal of 3 pocket-knives is recorded by Beek⁶⁹_{No. 39, '94}

Fischer, of Strasburg,³³⁶_{July 6, '95} to insure union of the stomach with the abdominal walls, recommended that the stomach be not opened and that the patient be fed by a cannula similar to Pravaz's, but much larger. The needle is pushed through the walls of the stomach lying in the abdominal wound, and fluid food—milk, etc.—is injected. In course of time the opening in the stomach is enlarged and a fistula is formed.

Gastropexy.—Duret¹⁰_{Oct. 2, '04} is of the opinion that in cases of prolapse of the stomach of long standing gastropexy is an efficient method of treatment, both with reference to fixation of the stomach and cessation of the majority of the morbid symptoms. He cites a case in which the operation was successfully performed after all other measures had failed to relieve a severe enteroptosis with dilatation and descent of the stomach into the infra-umbilical region.

Le Dentu¹⁴_{Mar. 20, '95} says that these operations for fixation do not always give a favorable result when the organ is almost or entirely full, and also when the organ is much curved. The stomach and intestines form a movable and elastic whole the constituent parts of which are far from being always individually diseased. Gastropexy often coincides with enteroptosis, and in such a case what would fixation of the stomach avail? In order to insure reasonable chances of success, the organ must be simply displaced, and not dilated.

Gastroplasty.—A. Wölfler, of Gratz,⁷⁶¹_{B. 13, H. 1, '95} operated upon a woman in extreme inanition, who had suffered from stomach symptoms for fourteen years, and found an extensive contraction of the middle part of the stomach, reducing it to the calibre of the pylorus, and producing the deformity known as “hour-glass” contraction, with distension of both portions of the organ, the constriction being so situated that the first, or cardiac, half had to lift the contents upward in order to make them pass through the abnormal opening, which lay near the lesser curvature. He made an anastomotic opening between the two halves, near the dependent portion of each, and the patient recovered and her symptoms were relieved.

Paul Courmont showed to the Lyons Medical Society²¹¹_{Sept. 29, '95} a patient upon whom Bouveret had performed gastroplasty for a bilocular stomach. Recovery was uneventful, the temperature reaching 39.3° C. (102.6° F.) the first day, falling to 38.2° C. (100.8° F.) the next, and being only 37.5° C. (99.5° F.) the ninth day. This is the third case of gastroplasty performed for bilocular stomach. One of those recorded was operated on by Doyen, of Reims.

Gastro-pyloric Operations.

Haberkant, of Dantzig,²²⁶_{B. 51, H. 3, 4, '95} has given us the most complete statistics of operations upon the stomach that have yet been published. His analysis of 359 operations (resections) shows 176 recoveries and 183 deaths. Of these 257 were for cancer, with 117 recoveries and 140 deaths; 50 were for ulcer, with 30 recov-

eries and 20 deaths. The total mortality for resection of the pylorus was 51 per cent; for cancer, 54.4 per cent.; for ulcer, 40 per cent. The mortality varied with the different surgeons, Bill-
roth's being 53.6 per cent., Lournstein's 66.6 per cent., and Czerny's 35 per cent. The results in gastro-enterostomy were: Total number of cases, 288. Cancer, 241 cases, with 136 recoveries and 105 deaths; ulcer, 47 cases, with 35 recoveries and 12 deaths. Total mortality, 41.5 per cent. Cancer, 43.5; ulcer, 25.5. Of the cases, 117 occurred in males, with a mortality of 50.4 per cent.; 96 in women, with a mortality of 35.4 per cent. The final results were: 30 died one to six months after operation, 12 in six months to one year and ten months. Only 2 cases were alive and in good health ten months after operation. Of 51 cases of cancer of pylorus which recovered after pylorotomy, 18 died within one year; 2 died thirteen months, 1 one and one-fourth years, 1 three years, and 1 five and one-fourth years after operation. Thirteen were alive and apparently well more than one year after operation. Of these, 4 had gone beyond three years, 1 five years and four months, and 1 eight years.

Ewald, of Berlin, ³_{Nov. 23, '94}, after reviewing the literature of surgical treatment of disorders of the stomach, found that in 158 cases of pylorotomy there were 90 deaths,—a proportion of 43 per cent. of cures; in 123 cases of gastro-enterostomy there were 38 deaths, making 69 per cent. of recoveries. It is probable that very recent statistics would modify these figures advantageously, but the author, nevertheless, believes that when a circumscribed tumor is present the operation should be practiced, always reserving, however, the prognosis.

Grundzach ¹¹⁶_{Mar., '95} gives the indications for pyloroplasty, pylorotomy, and gastro-enterostomy. He would operate only in marked cases of dilatation of the stomach, as where the remains of the food ingested the previous day are found in the stomach in the morning, where the condition has existed for some time and has resisted all dietetic and therapeutic measures, where the system is poisoned by the products of fermentation, and where general nutrition is affected and the strength of the patient is failing. The operation may be performed either by making a fold parallel to the axis of the stomach or obliquely to this axis; or, preferably, gastro-enterostomy may be done. This is especially advised in cases due to cicatricial stricture of the pylorus, as here resection may necessitate rupture of adhesions and perforation of the ulcer may result. Pyloroplasty is indicated when the pylorus is mobile and the stricture is due to a small cicatrix.

Podres ⁵⁸⁶_{No. 8, '95} states that in cases of cicatricial affections of the

pylorus, particularly if extensive adhesions exist, better results are attained by Loreta's operation than by gastro-enterostomy. Corazza, of Verona, ⁶_{Feb.16,'95} records a successful case of pyloroplasty, and adds a series of 27 other cases by Continental surgeons. Together with Miller's case ⁶_{Dec.1,'94} and Morison's case ⁶_{Feb.16,'95} a total of 53 cases of pyloroplasty has been carried out for pyloric stenosis. Of these 6 have proved fatal,—2 from collapse, 3 from sepsis, and 1 from internal hæmorrhage consecutive to the operation.

Slajmer ³⁸³_{No.1,p.6,'95} adds a successful case; Köhler, of Berlin, ¹⁴_{May 5,'96} 2; Wiesinger, of Hamburg, ³⁴_{May 28,'95} 1, and Markoe, of New York, ⁴⁶_{Dec., '94} another.

A modification of pyloroplasty proposed by Mayo Robson, of Leeds, ²_{July 20,'95} consists in the use of a bone bobbin, which expedites the procedure and, in the author's judgment, renders the operation safer than suture alone. After making the usual incision, the bobbin is introduced and the mucous and serous coats united separately by a continuous suture. The bone tube secures an immediate and thoroughly patent channel, and affords protection to the line of sutures for from twenty-four to forty-eight hours, when union should be well established. He refers to three cases in which this operation was successfully performed.

Durante, ⁵⁰⁵_{p.1395,'94} in a difficult case, in which the pyloric wall was torn while performing pyloroplasty, resorted to a sort of autoplasty to repair the accident. He prolonged the incision on the anterior surface of the stomach upward, lowered the triangular flap thus formed until the duodenal incision was reached, and there sutured the edges. Perfect recovery had been maintained for two years after this operation.

R. B. Duncan, of Kyneton Hospital, Australia, ²⁸⁵_{Sept.20,'94} presented a patient before the Melbourne Medical Association upon whom he had, three years and one-half previously, successfully performed Loreta's operation for narrowing of the pyloric orifice.

Two cases of total resection of the pylorus are recorded by A. Kablukow, ⁵³⁰_{No.1,'95}—one fatal, the other ending in recovery.

Cases of pylorotomy are reported by Armstrong, of Montreal, ²⁸²_{Oct., '94} and T. R. Jessup, ²_{v.1,p.189,'95} the latter case being in good health three years after operation.

Ogston, of Aberdeen, ⁶_{Mar.23,'95} suggests a new method of treating non-malignant strictures of the pylorus. It consists in giving the patient graduated balls of gutta-percha coated with sugar to swallow. The size of the pylorus is approximately ascertained by noting carefully the character of the food which the patient can take and the amount of discomfort it occasions. A suitably-sized ball is given to the patient every morning, and if it engage the

stricture somewhat closely a good deal of pain and inconvenience is caused by it. The same-sized ball is repeated morning by morning until it passes without discomfort, when another larger one is substituted. It was found that this change was needed about every five days. Only four cases have been treated in this way up to the time of the appearance of the article, and of these only one had continued it for any length of time. In it eight hundred and ten days had been required to dilate the pylorus from sixteen to forty millimetres of circumference; with care in diet this was considered sufficient for the needs of the patient, if he abstained from unminced meat. The development of this idea will be watched with considerable interest.

Gastro-enterostomy.—Rochet⁸⁶⁸_{Aug. 17, '95} lays down the following rules for the performance of gastro-enterostomy for obstruction of the pylorus: Wash out the stomach, open the abdomen at the site chosen, ascertain the lesions present, and look for Treitz's ligament in order to find the first loop of the jejunum; break down the gastro-colic omentum and push the greater omentum into it; suture the transverse colon to the stomach in four or five places; cut the jejunum in two; fix the lower end to the anterior wall of the stomach near the greater curvature by means of the largest size of Murphy's button; fix the upper, or duodenal, end to the lower end laterally, a little below the insertion to the stomach, by means of a small Murphy button, and close the abdominal incision.

Roux, of Lausanne,¹⁰⁸_{Sept. 15, '95} recommends Courvoisier's method in performing gastro-enterostomy, the intestine being inserted into the posterior surface of the stomach and the food passing easily through the artificial pylorus. He insists upon the value of three rows of sutures, solidly inserted, this permitting the patient to partake of food the following day and rendering it unnecessary to restrict him to a diet,—a dangerous practice in cases already weakened before operation. Bidwell⁹²_{Mar. 13, '95} prefers sutures to mechanical appliances, and points out that all the cases of contraction of the anastomotic opening followed operations where the latter were used.

Herbert Allingham, of London,²_{May 18, '95} gives notes of 13 cases of operation of the stomach, comprising 7 gastrostomies, 4 gastro-enterostomies, 1 Loreta operation, and 1 pyloroplasty. There were 3 deaths out of the 13,—1 gastrostomy, 1 Loreta operation, and 1 gastro-enterostomy. If such operations are to be of any use he believes that they must be done fairly early. When patients have to decide whether or not to have recourse to operation they rarely hesitate, having, in fact, to choose between two

evils. He maintains that gastro-enterostomy should be done in every case of pyloric stenosis with marked gastric dilatation, the relief being so great. In one of his cases the patient gained 42 pounds (20 kilogrammes) in weight and was enabled to resume her occupation, and, although she was once again very ill, he thought such a result justified having recourse to the operation in every suitable case.

Lauenstein, of Berlin, ⁶⁹_{No. 36, '95} reports four cases of gastro-enterostomy. One of the patients was a female who had stenosis of the pylorus, which had arisen from a small ulcer on the lesser curvature of the stomach. There was an absence of free hydrochloric acid in the gastric juice. As total extirpation of the uterus for cancer had previously been performed, a portion of the stomach was resected and microscopically examined, but no proof could be obtained as to the cancerous nature of the condition in the stomach.

Von Hacker, of Vienna, ⁸_{Nos. 25, 27, '95} in reporting three cases of cancerous stricture of the pylorus successfully treated by operation, states that it is especially in benign cicatricial stricture that gastro-enterostomy gives good results. The same is true of gastrostomy for dilatation of the closest strictures.

Cases of gastro-enterostomy are also recorded by W. Lesin. ⁵⁸⁶_{No. 35, '95} A. Kadjan. ⁸⁵⁹_{No. 21, '95} and Kischkine. ¹⁶⁴_{Dec. 19, '94} Plettner, ³³⁶_{July 6, '95} of Dresden, is a partisan of Kocher's method and describes a case in which he used it with good results.

Borelius. ¹⁶⁴_{Oct. 2, '95} in describing a case of operation for dilatation of the stomach, states that surgical intervention is indicated whenever medical and dietetic treatment has failed after a sufficiently extended trial. The aim of the operation should be to diminish the size of the operation, either by gastro-enterostomy or by a pocket suture of the two walls.

Rosenheim, of Berlin, ⁴_{Dec. 10, '94} examined the stomachs of ten individuals in whom gastro-enterostomy had been performed, and noted that delay in the downward progress of the stomach-contents was almost invariable, hypersecretion becoming in that case a secondary abnormality. Among cases cited he describes one of pyloric obstruction due to cicatricial contraction of an ulcer, in which gastro-enterostomy had been done by Hahn four months before. The fasting stomach was empty one hour and three-quarters after a test-breakfast. The secretory and motor functions were normal and the patient had gained 52 pounds (23.6 kilogrammes) in weight. The gastric hypersecretion noted before the operation being, in the author's opinion, now cured, the abnormality in secretion was considered by him secondary; and he

contends that, in such a case as this one at least, hypersecretion is no contra-indication to the operation.

Debove and Soupault, of Paris, ¹⁰ ² studied the process of gastric digestion in a man, aged 37 years, on whom Terrier had performed gastro-enterostomy for pyloric cancer. The patient was greatly relieved by the operation; his gastric symptoms disappeared, and he gained 38½ pounds (17.5 kilogrammes) in three months. Examination by means of test-meals showed that there was still gastric stagnation, that peptic digestion was almost inhibited by the absence of HCl, and that, shortly after each meal, bile and pancreatic juice flowed back into the stomach without causing any inconvenience. The case was further interesting from the fact that the physical and chemical signs led originally to the diagnosis of cicatrizing ulcer, in spite of which malignant disease was found at the operation.

The mechanism of the reflux of bile into the stomach and the accumulation of matters in the upper part of the intestine after gastro-enterostomy has been also studied by Villard, of Lyons, ²¹¹ ^{July 14, '95} who concludes that it is advisable to operate on a loop of intestine, distant at least forty or fifty centimetres from the duodeno-jejunal flexure, in order to prevent symptoms of such reflux and accumulation.

Theoretically it is natural to suppose that the stomach, when placed in communication with the small intestine, as in gastro-enterostomy, becomes unfitted to retain food during a certain period, and that hence the gastric functions are abolished. Hayem, however, ¹⁴ ^{Nov. 10, '95} has found that this was not the case with two patients in his clinic who had undergone gastro-enterostomy for grave stenosis. He claims, indeed, that the operation can only become an obstacle to the performance of the chemical functions of the stomach by rendering impossible the retention of food for the time necessary. In one of his patients the gastro-intestinal fistula resulting from the operation did not correspond to the lowest point of the stomach, and this is probably the case in many such operations.

Albert Mathieu ¹⁴ ^{Nov. 10, '95} presents two cases which lead him to similar conclusions, and states that the researches of Rosenheim in analogous instances lead to the conclusion that the motor functions of the stomach are of more importance here, as in many cases of dyspepsia, than the chemical functions. The patient may continue to do well as long as the evacuation of the stomach-contents into the intestine goes on, even though the chemical properties of the gastric juice have diminished. In spite of this fact, it is not without interest to note that the functions of the stomach are not completely destroyed by gastro-enterostomy.

Three cases of gastro-entero-anastomosis for cancer of the pylorus are recorded by Edmond Blanc, of Amiens, ²²⁸_{Feb. 15, '96} death taking place in three months in the first case and four months in the second and on the third day in the third case, the fatal result being here due to sudden and violent hæmatemesis. A fatal case is also recorded by Brunon, ²²⁸_{July 15, '96} G. Houzel ¹⁰⁴³_{Nov., '94} performed gastro-enterostomy in a case of inoperable cancer of the pylorus, the patient recovering. Thomas Sinclair ²_{Jan. 26, '95} used Senn's decalcified-bone plates in a case of gastro-enterostomy for pyloric stenosis. The patient left the bed on the fifteenth day, and at the end of a month had gained two pounds in weight and was in good condition. A successful case of gastro-enterostomy by means of Murphy's button, for cancer of the pylorus, is published by Lenger, ²⁹³_{July, '96} of Liège.

SURGERY OF THE PANCREAS.

Pancreatitis.

W. Körte, of Berlin, ²⁰⁶¹_{'94} whose experience in the surgical treatment of this affection includes four cases, has always observed, in the subacute stage, the symptom referred to so much,—namely, the appearance of a tumor in the epigastrium, which could be felt between the stomach and colon, and which extended to the left and was sometimes most prominent in the left lumbar region. The pus which forms in the pancreas and about the organ may rupture through into the bursa omentalis, where it may form an encapsulated abscess or may dissect down back of the peritoneum. The autopsies show that the pus may take any of the following courses: 1. Perforation of the bursa omentalis. 2. Burrowing downward to the left behind the descending colon. 3. More rarely burrowing down to the right. 4. Downward between the layers of the mesocolon transversum or the mesentery. The diagnosis rests upon the characteristic onset, followed by the appearance of the epigastric tumor or the lumbar swelling at the left side. This may be confused with other purulent infiltrations into the bursa omentalis, as occur in gastric ulcer or carcinoma. In the second form perinephritic suppuration must be eliminated by very careful examination.

Exploratory puncture in the first form may be of possible value, when the preparations are ready for following with immediate operation. Puncture is also advisable in the retroperitoneal suppurations. The treatment depends upon the diagnosis. Abscesses of the bursa omentalis require laparotomy and suture and drainage of the abscess-wall as a cyst. The retroperitoneal form can be treated by incision in the flank.

J. W. Elliot, of Boston,⁹⁹_{Apr. 11, '95} describes the case of a man who, five days before admission to hospital, was suddenly taken with an attack of severe vomiting; a few minutes later he felt a hard pain in the left side, which pain had continued ever since. At first it was more general, but later it became localized near the spine of the ilium. He had vomited several times each day, and the bowels had been moved by enemata. There had been no chills nor sweating. Examination of the abdomen showed a dome-shaped prominence in the epigastrium, which felt like a doughy tumor. This mass extended along the border of the ribs on the left side to a point just above the superior spine of the ilium.

A diagnosis of pancreatitis was made, and, operation being decided on, a four-inch incision was made in the median line, over the most prominent part of the tumor. The omentum was found much thickened and studded with white spots of fat-necrosis. Two openings were made through the omentum,—one straight down in the median line which gave no result, and one down to the left into the doughy tumor to a point corresponding to about the middle of the pancreas. The patient died three days later, and at the autopsy the pancreas was found to be the seat of disseminated fat-necrosis, only a portion of the head and tail retaining any semblance of normal structure.

Thayer, of Baltimore,⁷⁶⁴_{Feb., '95} reports a case showing that surgical interference in suppurative pancreatitis may be expected to materially reduce the death-rate, if the diagnosis be made sufficiently early. Chemical examination in a case coming under his observation showed that the areas of fat-necrosis removed by operation consisted of a combination of lime with fatty acids.

Sarfert³⁰¹_{B. 42, II. 1, 2, '95} discusses the cause and mechanism of death in apoplexy of the pancreas, three cases of which have come under his observation. The etiology of the affection is obscure, syphilis, alcoholism, obesity, and arterio-sclerosis having been advanced as possible causes, without, however, any indications as to the manner in which these varying lesions could end in apoplexy of the pancreas. Two of Sarfert's patients were addicted to alcohol. As regards the mechanism of death in these cases, he believes that there is a reflex action on the heart, as well as an auto-intoxication by intestinal products. Basing his theory upon the experiments of Hildebrand and Jung, he claims that the pancreatic juice acts directly upon the intestine, causing lesions such as congestion, ecchymoses, etc., which favor the absorption of toxins and permit the passage of bacteria through the walls of the intestines. In two cases in which he made a bacteriological examination of the fluid exudation into the peritoneum, the author found coli bacilli

in one and chains of micrococci in the other. Auto-intoxication generally occurs in subacute cases, and here laparotomy may be of value, guided by the formation of a tumor in the epigastric region and the presence of sugar in the urine, as noted in several cases. Sarfert believes that in acute cases surgical intervention is useless, as exact diagnosis is almost impossible.

Pancreatic Cysts.

In a paper on ruptures of the pancreas and their relation to pancreatic cysts R. F. C. Leith, of Edinburgh, ³⁶_{Nov., '95} brings forward evidence to show that ruptures of the pancreas need not in themselves prove fatal, and it is quite conceivable that many such ruptures may occur, and probably have done so, in varying degrees of severity, in cases of abdominal injury which have entirely recovered. Perhaps large ruptures may lead to such an extensive outpouring of pancreatic secretion, mixed with blood-clot and fragments of devitalized pancreatic tissue, that its escape through the foramen of Winslow into the general peritoneal cavity may set up a general chemical, and perhaps also organismal, peritonitis. It is more probable, however, that the lesion in the gland is followed by inflammation, which results in nothing worse than a certain amount of cicatricial contraction, and the patient recovers entirely without the subsequent occurrence of any other trouble. Cases have been recorded in which even extensive cicatrization of the gland existed without any suspicion of its presence during life. It is obvious, however, that other possibilities exist. There is room for other results between those two extremes. The lesion in the gland may be followed by an inflammation, not restricted to the gland itself, but spreading gradually to other tissues in its neighborhood, and leading, perhaps long afterward, to subsequent trouble. This supposition is further strengthened by the fact that many cases of injury received in the epigastric region have been followed, sometimes long afterward, by the appearance of a cyst in this region, and the relation which the so-called "pancreatic cysts" have to ruptures of the gland itself is a most interesting one. Increasing attention has been, of late years, paid to the subject of these cysts, and a definite traumatic origin has been assigned to a large proportion of the reported cases. The earliest in the seventeen cases collected by the author from the literature was noted ten days and the latest eight years after injury. The most natural, and also most probable, theory of the causation of such cysts is that advanced by Cathcart, ²⁰⁶²_{p. 80, '89-'90} which is as follows: "The injury causes a laceration of the gland. This is followed by extravasation of blood, and with this is mixed the pancreatic secretion from the

torn ducts. Not only is a constantly-increasing fluid thus added to the original hæmatoma, but the collection of fluid probably becomes irritating in character. It will thus tend to excite the formation of a capsule around it, and, by chemical irritation and tension, would gradually increase in size." Obvious and simple as this explanation is, we must remember that it is hypothetical, and before we can accept it as being the mode of origin of these pancreatic cysts we must exclude the possibility of other and neighboring structures acting as primary factors in their formation. We cannot do this, for we find that many cases of similar cysts in this region arise apparently spontaneously. From the evidence of other authors it is clear that cysts, both traumatic and spontaneous, may arise from the peritoneum, and, hence, many of those recorded as present in the mesogastric region may be fairly enough referred to the lesser omentum as their source of origin. Rouiller suggests²⁰⁰⁰ that a sclerosis of the peritoneum, of alcoholic origin, first causes hæmorrhage and then a cyst; and Fischer that the lesion is nervous, probably having its origin in the solar plexus. The latter holds that the hæmorrhage is not really situated within the pleural cavity, but between the omental or mesenteric layers. At all events, they simulate pancreatic cysts more closely than any others; and if the record of the latter be scrutinized it will be seen that many of them, both traumatic and spontaneous, have no real right to their name, as they had probably no connection with the pancreas. On prognostic and therapeutic grounds, however, a perfectly-accurate diagnosis is not, after all, so much of a desideratum, as all cases, whether pancreatic or not, seem to be equally amenable to treatment by laparotomy and drainage. In the discussion Joseph Bell³⁶_{Oct., '95} stated that he had operated in one such case,—that of a woman who had been injured by the shaft of a dog-cart. He opened the omentum, but, finding nothing, scraped cautiously through the gastro-hepatic omentum and found a cyst with a thickish wall; he scraped cautiously through that with his nail and evacuated about a pint of foul pus. In this case about three weeks had intervened between the injury and the operation.

A case of retention cyst of the pancreas recorded by Joseph Kurtz, of Los Angeles,⁴¹_{Jan., '95} is interesting on account of the extremely rapid development of the cyst after the injury and the rapid refilling of the same after puncturing, evidently due to a laceration of Wirsung's duct, perhaps in the middle of the pancreas, speedily followed by cicatrization, which cut off a great part of the duct from its outlet.

In a case operated on by R. F. Tobin, of Dublin,²²_{July 17, '95} the fluid removed from the cyst was slightly turbid, alkaline, and

albuminous. In the cyst there was also found an amorphous mass the size of a walnut, and resembling putty in appearance and feel. Cultivation and inoculation experiments with this substance and with the fluid removed gave negative results, as did also microscopical examination.

A case of blood-cyst of the pancreas following influenza, described by Filippi,²⁵⁹_{Oct. 31, '94} was opened by Novaro, and gave exit to about 2 litres (quarts) of sanguinolent fluid. Charles H. Ott and W. L. Estes, of Bethlehem, Pa.,⁷⁸⁷_{Sept., '95} report a case successfully treated by operation, and M. H. Richardson, of Boston,⁹⁹_{Mar. 21, '95} one successfully treated by drainage. About 2 pints (1 litre) of fluid were withdrawn by aspiration. The parts about the exposed portion of the tumor were then walled off with gauze, and a free opening was made by which about 2 quarts (litres) of fluid escaped.

Tumors of the Pancreas.

Krönlein, of Zurich,³³⁶_{July 6, '95} states that carcinoma of the pancreas is rare, only 6 per cent. of all carcinomata being found in this organ. Growths situated in the small end of the pancreas are the most favorable for operation. He reports a case of sarcoma where the isolation of the pancreas was very difficult and where ligature of the pancreatico-duodenal artery became necessary; gangrene of the colon resulted and caused the death of the patient on the seventh day.

E. M. Foote, of New York,¹_{Sept. 7, '94} records a cyst of the head of the pancreas in a woman, aged 38 years, who four years and a half before had noticed an irregular swelling to the left of the umbilicus, causing absolutely no symptom except the consciousness of its size. The general health was excellent.

An operation was performed and the cyst drained, but metastasis followed, and at the death of the patient the autopsy showed the original cyst to be part of an adenocarcinoma of the tail of the pancreas. The growth lay between the stomach, pancreas, transverse colon, and spleen, being especially adherent to the pancreas and the transverse colon, although the wall of the latter was not invaded. The pancreatic duct was in no way affected, and the large daily discharge must have come from the growth itself. There were numerous secondary nodules in the omentum and liver. The other organs were free.

SURGERY OF THE LIVER.

In an exhaustive paper on the surgery of the liver, von Bergmann, of Berlin,²²⁶_{B. 46, H. 2, '95} states that since Ponfick's demonstration that portions of the liver removed by operation were speedily and

certainly replaced by growth of the remaining portion, and that the parts thus renewed performed their function normally, the surgeon has been justified in removing, when necessary, even large portions of the organ. Echinococcal infiltration frequently renders the removal of large pieces of liver necessary, as does injury of the gland with prolapse. A syphilitic lobe of the liver has on several occasions simulated a tumor, and attempts to remove it have been made before the mistake was discovered by Wagner, Lauenstein, and Tillmans. Where it is recognized that the tumor is a product of syphilis von Bergmann advises against further intervention, and in doubtful cases he believes that the tumor should be stitched into the abdominal wound. The cavernomata are generally small and insignificant, but when they cause trouble by excessive growth they should be extirpated. Cysts lined with epithelium, developing from pre-existing or newly-formed biliary passages, require similar treatment. In carcinomata, however, operation is comparatively aimless, as either the whole organ is implicated or the growths are of metastatic origin. Operation may be performed, however, in case of adenoma allied to carcinoma, and von Bergmann reports a successful case of this kind. In another case, likewise operated on by the author, it was doubtful whether a movable kidney was the site of a tumor or whether an echinococcal cyst was attached to the liver by a slender pedicle. Operation revealed a tumor of the liver, which was afterward proved to be an adenoma.

Hepatic Abscess.

The causal connection between dysentery and tropical abscess of the liver is well shown in a case reported by J. Curnow, of London, ⁶May 4, '95 in which hepatic abscess followed amœbic dysentery. In almost every case of hepatic abscess seen at the Seamen's Hospital, during ten years, there had been a history of antecedent attack of dysentery, but the case reported was the first in which the causal connection could be proved by the discovery of amœbæ dysenteriae in the pus and in the evacuations. Operation was followed by complete cure.

A. A. Forsythe, of Monroe, La., ¹²Dec., '94 after reporting nine cases, advocates complete operation at one sitting, regardless of adhesions. Iodoform gauze, properly packed around the drainage-tube and between the liver and abdominal wall, supplies all that could be desired to prevent leakage of pus into the peritoneal cavity until adhesions take place. The incisions should be made below the ensiform or costal cartilages, the puncture and incision in the liver being made near the lower end of the abdominal

incision; should the liver be much enlarged and the accumulation of pus be great, the hepatic ligaments are thus put upon the stretch, and as soon as the pus is drawn off the liver recedes in an upward direction. If, on the contrary, the liver is entered at a higher point, trouble may be experienced in getting the drainage-tube in and in properly adjusting the gauze after the organ recedes.

Polk, ⁵⁹_{Jan. 5, '95} mentions a case of abscess of the liver, with inflammatory obliteration of the gall-bladder, which he operated upon by the open method, employing gauze drainage. It illustrated the innocuousness of the open method of treating hepatic abscess.

Pantaloni, ²⁰⁶³_{'95} in reporting four successful operations for abscess of the liver, states that, in view of the uncertainty as to whether the contents of the abscess be sterile or not, and in the absence of adhesions, the abdominal or pleural cavity, as the case may be, should be carefully shut off from the seat of puncture by stitching the parietal peritoneum, or, when the opening is made through the chest-wall, pleura, peritoneum, and diaphragm to the surface of the liver. In abscess of the posterior and superior part of the right lobe, he advocates a large opening in the wall of the chest. He does not approve of instrumental scraping of the inner surface of the abscess, and objects to frequent washing out of the cavity. He recommends, however, a copious injection of a weak sublimate solution at the time of the operation.

Fontan, of Toulon, ³⁶³_{Aug. 25, '95} who has operated in forty cases of tropical abscess of the liver following dysentery, feels warranted in his belief that these should always be opened freely as soon as their existence has been determined. The incision should be at least eight to ten centimetres in length, layer after layer being opened, and, if necessary, one or more of the costal cartilages resected. Fontan makes a series of sutures in the pleura or in the peritoneum, forming a channel from the cavity of the abscess to the surface, so that the pus may thus escape without entering into the pleural or peritoneal cavity. Having freely opened the abscess, he cures the cavity carefully with a long curette, employing continuous irrigation and continuing to scrape until the water flows out clear. He is then sure of having reached the healthy tissue and of having removed all the diseased parts. Objection has been made as to this method of curetting as likely to cause hæmorrhage, but he has never observed any tendency to such a result; on the contrary, the removal by use of the bistoury has sometimes led to death from hæmorrhage when a large branch of the portal was injured. There need be no fear of wounding the vessels with the curette, for they are in the condition of thrombus in the diseased

parts around the abscess. Statistics fully prove the advantage of curetting. The opening with the bistoury gave, before the introduction of antiseptic treatment, 20 per cent. only of cures, and since that time they have varied from 37 to 51 per cent., according to different authors. He has obtained 80 per cent. of cures and attributes this remarkable success to his method of operating.

Floating Liver.

Bastianelli ⁹²¹_{Apr., '95} operated in a case of floating liver belonging to that class in which some portion of the liver-substance has been partly constricted off from the general body of the organ, and, remaining attached by a more or less extensive peduncle, gives rise to a movable tumor in the abdomen. His patient, a woman of 37 years, presented a tumor on the right side the shape of a kidney, but three times as large, though varying in size, hard, slightly nodulated, and easily movable, but scarcely moving with respiration. The upper end seemed twice the size of the lower; no connection with the liver could be made out; behind the tumor a semi-elastic body could be felt. A diagnosis of cancer and displacement of the kidney was made, and laparotomy revealed an ovoid tumor connected by a band of liver-tissue with the right lobe of the liver. It was removed with the gall-bladder, the patient making a good recovery. The portion of liver removed weighed 500 grammes (16 ounces) and showed recent gummata in its substance.

Lanelongue and Faguet, of Bordeaux, ³_{Aug. 7, '95} operated in a case in which the symptoms had led to a diagnosis of tumor of the large intestine, probably coincident with atrophic cirrhosis. Laparotomy showed that the liver, which was the seat of atrophic cirrhosis, had completely prolapsed, the suspensory ligament being entirely destroyed. A small quantity of ascitic fluid was present, but the large intestine and mesentery were healthy. As it was impossible to reduce the liver, the authors freshened the convex surface of the organ by means of the bistoury over a portion (six by three centimetres) corresponding to the former position of the falciform ligament. The hæmorrhage was slight, and three catgut sutures through the abdominal wall and a rather thick layer of the hepatic tissue were sufficient to bring the freshened portion in contact with the parietal peritoneum. Two years and nine months later the patient was seen again by the authors and was found to be relieved of the functional troubles and abdominal pain from which she had suffered before operation. The liver was still prolapsed, but was fixed to the abdominal wall by extensive adhesions. The cirrhosis had not appeared to have made any notable progress.

Injuries of the Liver.

The diagnosis of rupture of the liver, according to Zeidler,⁶⁹_{Sept. 13, '94} is rendered difficult by the fact that the local symptoms do not arise till late, while the danger is greatest during the first twenty-four hours. The diagnosis is easier when a wound of the abdominal wall has occurred. From the fact that small wounds of the liver may produce severe hæmorrhage which external measures are insufficient to control, and that spontaneous arrest is unlikely, the author recommends laparotomy, suture of the liver, Paquelin's cautery, or the tampon. Paquelin's cautery can hardly arrest hæmorrhage from large vessels in deep wounds of the liver; here the suture may be used. The blood-pressure in the liver-vessels is low; hence arrest of hæmorrhage can surely be obtained by the tampon. The wound in the liver can also be better observed where the tampon is used. The author reports three cases of his own in which these measures were successful.

Thomas Bryant, of London,⁶_{Nov. 2, '95} describes the case of a boy, aged 16, who walked into Guy's Hospital after having been run over by the wheel of a cart which had passed over his abdomen. The boy, although in pain, had walked at least a quarter of a mile to the hospital after the accident. When admitted he was pale and in great pain, but his pulse was full and there were no external signs of injury. On the fifth day he rested with his legs outstretched, but rather to the right side, and later on the same day he had an action of the bowels, which was accompanied with severe abdominal pain and speedily followed by collapse and sudden death. After death a fissure three inches deep was found in the right lobe of his liver, filled with blood-clot and covered with lymph.

Lyonnet, in his own name and that of Jaboulay,²¹¹_{No. 10, '95} reported to the Lyons Medical Society a case in which, after severe contusion in the hepatic region, swelling, with considerable rise of temperature, supervened. Jaboulay made an incision in the median line and penetrated into a cavity, from which about a quart of reddish fluid issued, leading him to suspect an injury to the liver. Thirty-five days later the patient was convalescent, with only a small fistula remaining. Gangolphe, in the discussion, related a case in which laparotomy showed that a revolver-ball had traversed the liver and was lost in front of the vertebral column. No attempt was made to extract it, the wound was closed up, and the patient, though an obese diabetic, rapidly recovered.

Tumors of the Liver.

John B. Roberts, of Philadelphia,⁵_{Dec., '94} describes a case in which an infiltrating tumor of the right lobe of the liver caused an

elongated process extending below the level of the umbilicus. The condition was mistaken for a non-malignant growth of the omentum, and was only recognized by exploratory abdominal incision. A somewhat similar case was operated on by Abbe, of New York, ⁹⁶_{Oct., '95} under the impression that it might be abscess. There was no abscess, but the liver was enormously enlarged and was studded with tumors from the size of a bean to an inch in diameter. There were also some crater-like scars on the surface of the organ. It did not look like cancer, but rather like syphilis, and Abbe therefore took out one of the tumors nearly an inch in diameter at the free edge of the organ, first ligating about it in sound liver-tissue by a chain of stitches. The patient recovered rapidly under specific treatment.

SURGERY OF THE GALL-BLADDER.

Cholelithiasis.

The indications for biliary operations in general are acute or persistent symptoms and signs of cholelithiasis unrelieved by medical treatment. Robson ²_{Mar. 16, '95} regards jaundice as a serious complication, and treats icteric patients with calcium chloride before and after the operation, to diminish the risk of hæmorrhage, but other surgeons attach less importance to this symptom. All recent work tends to show that the escape of bile into the peritoneal cavity is not in itself a dangerous event, provided no septic influence is superadded. This is especially shown by a case recorded by Hans Kehr, in which the apex of the gall-bladder was shot off by a bullet, and one in which Thiersch removed 40 pints (20 litres) of bile from the peritoneal cavity after rupture of the gall-bladder. In both there was perfect recovery.

W. E. B. Davis, of Birmingham, Ala., however, described to the American Association of Obstetricians and Gynæcologists ¹_{Oct. 26, '95} a large number of experiments which he had made on dogs to test the value of gauze in draining off bile in injuries of the gall-bladder and ducts. He had removed the gall-bladder, without tying the duct, by packing with iodoform gauze. The animals had recovered. In another instance he had incised the gall-bladder and ducts and packed with gauze around the openings, no stitches having been used, and the animals had recovered. Complete walling off of the general cavity had been noted when the abdomens of the animals had been opened, in a number, at the end of forty-eight hours. Davis also reported the case of a human subject in which he had removed the gall-bladder and a portion of the cystic duct where there had been obstruction in the common

duct and packed with gauze after introducing a glass drainage-tube, and there had also been complete walling off of the general cavity. He advised that, in cases of obstruction of the common duct, no attempt should be made to suture the opening after the obstruction had been removed, as the patient's condition was nearly always serious and a prolonged operation would terminate fatally. The obstruction should always be removed, if possible. Davis's experiments demonstrated conclusively that the peritoneum was capable of bearing the presence of a small amount of bile, but that large quantities or the constant extravasation of it would produce a fatal peritonitis, usually in from twenty-four to forty-eight hours. He thought that the field of cholecystenterostomy was a very limited one.

Nasse, of Berlin,²⁰⁶¹₇₄⁹⁹_{Oct. 3, '95} has studied the effect of extirpation of the gall-bladder, and finds that guinea-pigs and rabbits are unaffected by its removal. He was unable to corroborate Oddi's results,—namely, that dogs, after removal of the gall-bladder, suffered great hunger, diarrhoea, and emaciation, and that later there developed a dilatation of the gall-ducts. The ligation of single branches of the hepatic duct caused an hypertrophy of those hepatic areas where the biliary currents were unobstructed. In the ligated portions small areas of necrosis were found; also proliferation of the gall-ducts and an increase of connective tissue. Rapid atrophy of hepatic cells and shrinking of the affected lobe occurred, this change being complete in four months, when the lobe consisted of fibrous connective tissue and gall-ducts. In cases where the obstruction of the ducts was temporary the development of ducts and connective tissue was checked, when the ducts became again patent. Even liver-cells regenerated after extreme degeneration.

Rutherford Morison, of Newcastle-on-Tyne,²_{Nov. 3, '94} draws attention to the anatomy of the parts concerned in the surgical treatment of gall-stones, with the object of demonstrating that a pouch exists behind the right lobe of the liver which has natural barricades separating it from the general peritoneal cavity, and that efficient drainage of this pouch is likely to serve a useful purpose in gall-stone operations. It can be efficiently drained through an opening in the parietes near the lower end of the kidney. A transverse is better than a vertical incision in operating for gall-stones, less likely to be followed by ventral hernia, and giving free access. Biliary fistula results from operations for gall-stones in a considerable percentage of cases in which the gall-bladder has been attached by sutures to the parietes. The method of attachment has little to do with this result and it may follow when the

ducts are patent. The gall-bladder and ducts may safely be allowed to empty into the pouch described, if it is properly drained. The gall-bladder should never, except when suppurating, be stitched to the abdominal wall. If the pouch is properly drained (a) when the gall-bladder is distended, the opening in it should be closed by sutures and the viscus returned into the abdominal cavity and the drain left until the certainty of its successful closing is complete; (b) when the gall-bladder is shrunken and there is difficulty in closing the opening made in it, it may be returned

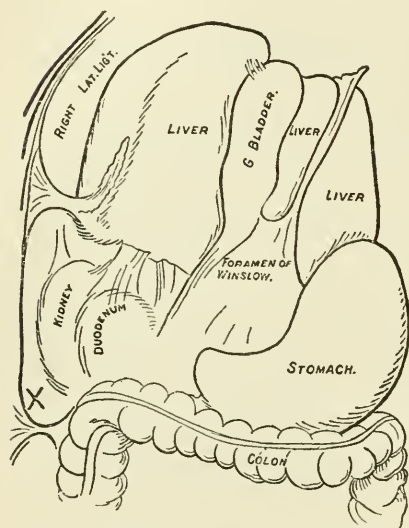


FIG. 1.—THE POUCH DESCRIBED SHOWN BY DRAWING LIVER UPWARD. X IN ALL THE FIGURES MARKS POINTS FOR DRAINAGE. (MORISON.)

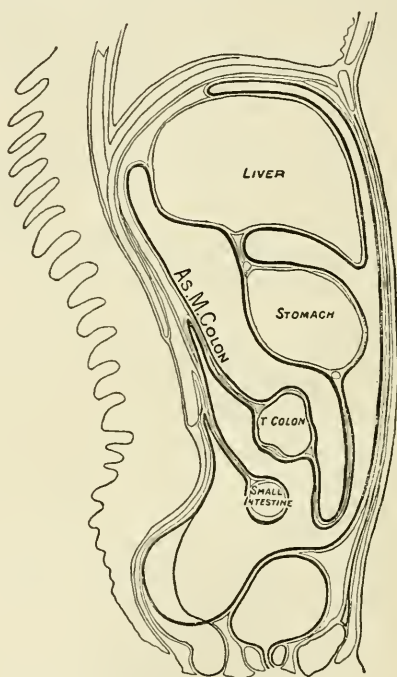


FIG. 2.—VERTICAL MESIAL SECTION. (MORISON.)

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unclosed; (c) when a stone is impacted in the cystic duct and evades all ordinary efforts to remove it, the gall-bladder should be excised and the duct ligatured after removing the stone in it; (d) when a stone is impacted in the common duct the duct is incised and, after the stone or stones are removed, the opening may be left unclosed if there is any difficulty in applying a satisfactory suture.

The accompanying cuts (Figs. 1, 2, 3, 4, and 5) illustrate the appearance of the pouch and the points for drainage.

The usual incision in operations on the gall-bladder ² Mar. 16, '95 is

three inches long in the upper part of the right linea semilunaris. More space may be obtained, if necessary, by a transverse cut at the upper end of this, and Czerny always employs a rectangular incision. Courvoisier prefers a transverse incision just below the ninth or tenth costal cartilage. Persistent biliary fistula, if it give rise to serious symptoms, can only be relieved by cholecystectomy or cholecystenterostomy.

Quénu, of Paris, ¹⁴_{May 12, '95} states that an exploratory operation is indicated when biliary retention has persisted for three months without amelioration. Such an operation is not always easy; when there are adhesions the relations are changed and the gall-bladder is not readily found. By following the course of the umbilical vein the ductus choledochus will be found on a plane oblique to it. If its relations are normal the liver can be elevated

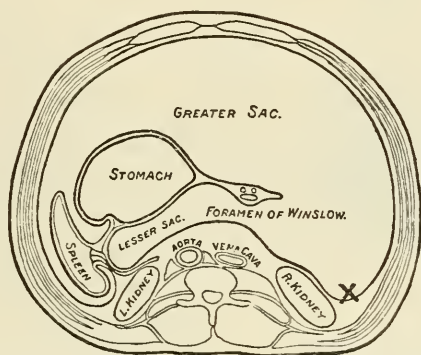


FIG. 3.—TRANSVERSE SECTION THROUGH CENTRE OF POUCH. (MORISON.)

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and the left index finger introduced into the foramen of Winslow, which is drawn down, while the right index finger follows the left border of the gastro-hepatic omentum. When a calculus is present he prefers to have recourse to choledochotomy, when simple pressure of the finger is not enough to cause the stone to pass into the duodenum. The higher up the calculus,—that is, the nearer the liver,—the more difficult is exploration, incision of the canal, and suture.

In such cases the duct may be left open, as the fistula will heal spontaneously, but drainage must be established in order to isolate the area from the rest of the abdominal cavity. The author recommends operating at a single sitting if protecting adhesions are present; if not, tampons may be used to provoke adhesions and a second operation performed eight days later, incising the canal and removing the calculus.

Ferguson ⁶¹_{Jan. 19, '05} gives the following indications for opening the abdomen and exploring the gall-bladder: 1. For attacks of biliary colic accompanied by distended gall-bladder which suddenly subside and no stone is passed. The stone has dropped into the bladder, and will attempt its escape again. 2. For repeated attacks of biliary colic where the bladder becomes enlarged and jaundice follows. A stone is lodged in the ducts, and must be removed to obtain relief. 3. For persistent tenderness over the gall-bladder. The interpretation of this sign is that a subacute

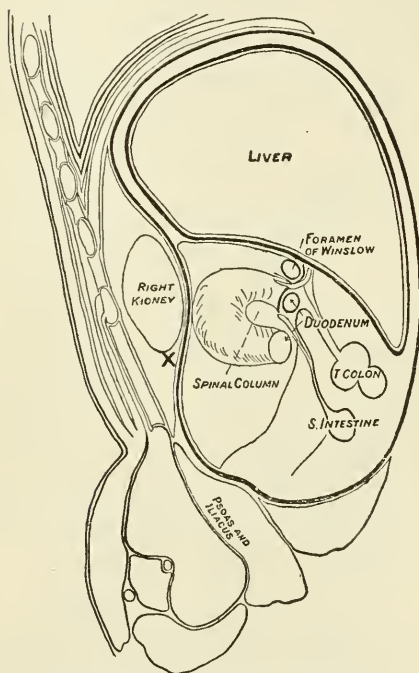


FIG. 4.—A VERTICAL ABDOMINAL SECTION BETWEEN ASCENDING COLON AND PARIETES ON LINE MARKED A, B, IN FIG. 5, SHOWING RISE FROM X OVER PELVIC BRIM. (MORISON.)

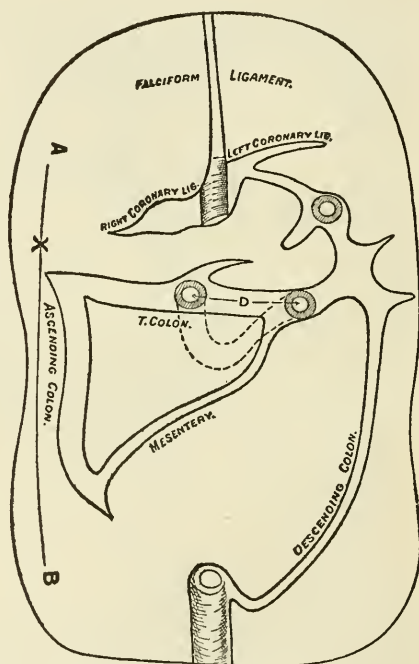


FIG. 5.—REFLECTIONS OF PERITONEUM FROM POSTERIOR ABDOMINAL PARIETES. (MORISON.)

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inflammation has been set up by the irritation of a stone. Such cases have a history of colic, and the results are apt to be gangrene of the gall-bladder, ulceration (with perforation, causing peritonitis), or cancer. 4. For persistent and marked enlargement. Such may indicate that the gall-bladder contains: a large number of stones or several very large ones; much mucus; large accumulations of bile; mixture of the two above; that a growth, cancer, or tumor is invading its walls.

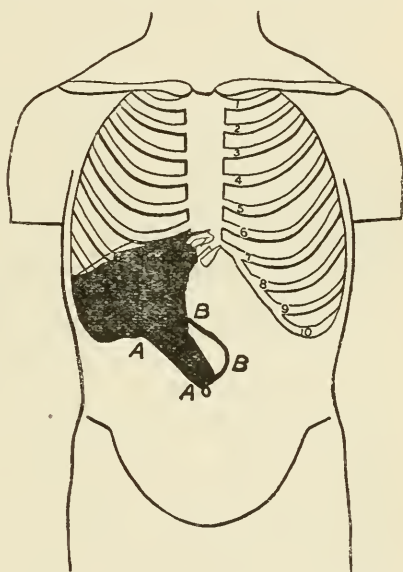
Enlargement of the Gall-bladder.

Cameron, of Glasgow, ³⁶June, '96 operated on a case of dilated gall-bladder containing calculi, supposed to be ovarian when admitted to hospital. There was a pyriform cyst, evidently connected with the liver, extending below the umbilicus and the size of a small child's head. He opened the abdomen and found it was a distended gall-bladder, from which he removed three stones,—one about the size of and resembling a nutmeg. Recovery followed.

In a case of dilated gall-bladder under the care of Stanmore Bishop, of Manchester, ⁶Dec. 22, '94 the patient died some days after operation, and post-mortem examination revealed the presence of another stone, though three had been removed, and the symptoms had not pointed to ulceration of an impacted calculus.

A case of enlarged gall-bladder with linguiform appendix of the liver was met with by J. B. Hellier, of Leeds, ²May 4, '96 who performed cholecystotomy and removed seven gall-stones. The case was an excellent illustration of a malformation of the lower border of the right lobe of the liver, described by Charcot ²⁰⁶⁵V.3, p.126 as frequently accompanying cholelithiasis. Already figured by Cruveilhier, and observed in one case by Trousean, this malformation has been recently studied by Riedel, ²⁰⁶⁶p.58, '92

who calls it "linguiform appendix of the liver." In six cases of biliary lithiasis in which this condition was observed the gall-bladder was enlarged in four and not in the other two. F. Glénard has observed the same condition, and maintains that the hypertrophied portion comes usually from the apex of the quadrate lobe, and Charcot has observed the same thing. This hypertrophic protrusion of the middle portion of the hepatic border is resistant, smooth, and slightly painful on pressure. It depends directly upon cholelithiasis, for if the bladder be once emptied and the calculus expelled the enlargement rapidly disappears. The above cut is a reproduction of Hellier's case.



ENLARGED GALL-BLADDER, WITH LINGUIFORM APPENDIX OF LIVER. (HELLIER.)

A A, appendix; B B, gall-bladder overlapped by above.

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Operations on the Gall-bladder.

Cholecystotomy.—H. Delagénère, of Paris, ³_{Oct. 26, '95} under the name of intra-parietal and transmuscular cholecystotomy, describes a method of suturing the gall-bladder to the anterior aponeurosis of the right abdominal muscle through a button-hole incision in the thickness of the muscle. The gall-bladder is first isolated from the peritoneum by a row of serous sutures, and a vertical button-hole incision is then made five or six millimetres from the free edge of the right muscle; the gall-bladder is drawn through this incision and kept in place by a suture uniting it to the anterior aponeurosis of the muscle. A drain is placed in the gall-bladder and the skin sutured. He performed this operation with success in three cases.

Oscar Bloch, of Copenhagen, ⁹¹_{Feb., '95}; ²_{Mar. 30} describes a new method of performing cholecystotomy, devised with the view of avoiding, on the one hand, peritonitis, which often results from the giving way of sutures after immediate closure of the wound in the gall-bladder, and, on the other hand, the formation of firm adhesions between the gall-bladder and the abdominal wall after the establishment of a temporary fistula. In the method called extra-abdominal cholecystotomy, which is advocated by the author and was successfully practiced by him, ³⁷³_{No. 23, '94} the distended gall-bladder is drawn through the abdominal wound and a portion about the size of a hen's egg outside this wound fastened by sutures until adhesions have formed and the peritoneal cavity has been closed. The gall-bladder is then opened and any gall-stones it may contain removed. The wound in its coats having been closed by sutures, the gall-bladder, after a further interval to allow of complete cicatrization, is separated from the margins of the incision in the abdominal wall and returned into the peritoneal cavity, the external wound being finally closed.

J. W. Elliot, of Boston, ⁹_{June 15, '95} contends that the operations of cholecystotomy and cholecystenterostomy have become too much the routine practice for the relief of gall-stones, and that incision of the ducts or the gall-bladder, followed by immediate suture, is the proper operation in the majority of cases, especially in recent cases. He reports five such operations,—1 on the hepatic duct, 1 on the common duct, and 3 on the gall-bladder, all successful. He advances the following conclusions: 1. Every operation should be conducted with the idea of restoring the functions of the ducts, and any irreparable injury to them is a serious calamity. 2. Immediate closure of the gall-bladder is safe if the ducts are clear and its walls healthy. 3. Incision and suture of the cystic duct are preferable to prolonged manipulation. 4. Incision and suture of the hepatic and common ducts constitute the operation to be

chosen for impacted stones. 5. The mortality of this operation is less than 18 per cent. 6. If the condition of the patient is critical preliminary cholecystotomy is advisable. 7. Cholecystenterostomy should be reserved for irremediable stenosis of the common duct.

Löwenstein⁴_{July 1, '95} relates five cases of cholecystotomy performed in two stages, one of the patients dying from inanition. He is of the opinion that an interval of eight or nine days is sufficient between the two stages of operation, instead of twelve, as recommended by Riedel.

Helferich, of Greifswald,⁹⁶_{Feb., '95} removed by cholecystotomy from a woman, 27 years old, a stone the size of a walnut, which was characterized by a peculiar, flat, warty surface, and a small peg-like process at the lower end. The latter had the form of an outgrowth of the gall-bladder into the cystic duct. Shallow lines inclosing little planes also marked the surface and represented the normal folds of the mucous membrane.

Successful cholecystotomy cases by Mixter, of Boston⁹⁹_{July 4, '95}; Bland Sutton, of London²²_{Jan. 2, '95}; S. H. Weeks, of Portland⁵⁹_{June 8, '95}; Porter, of Boston⁹⁹_{July 4, '95}; W. H. Battle, of London²²_{July 31, '95}; C. de Heideken,⁴⁹⁸_{V. 36, No. 12}; Wm. Anderson, of London⁶_{Nov. 17, '94}; Shepherd, of Montreal²⁸²_{Oct., '94}; L. H. Dunning, of Indianapolis.⁵⁶_{Dec., '94}

A good review of the surgical treatment of cholelithiasis is given by Hugh M. Taylor, of Richmond, Va.⁴³_{Oct. 5, '95}

Cholecystectomy is indicated, according to Vautrin,¹⁸⁴_{No. 2, '95} in cases in which changes in the wall of the bladder prevent the re-establishment of the physiological functions, as in tumor or empyema. Cholecystotomy is indicated when the organ may be restored to its functions, as in lithiasis, dropsy, injury, fistula, etc. Choledochotomy is indicated for calculi in the ducts, and may be aided by cholelithotripsy. Drainage of the artificially closed subhepatic cavity is the principal guarantee of success.

O. F. Ringstedt²⁰⁶⁴_{'94} performed cholecystectomy in a case of dropsy of the gall-bladder due to calculi, the patient dying of septic peritonitis. A case of cholecystectomy is recorded by G. F. Hurlbert, of St. Louis.³⁹_{Apr., '95}

Cholecystenterostomy.—The ideal operation, in the opinion of J. H. Hoelscher, of Chicago,⁵⁹_{Dec. 8, '94} consists in making an anastomosis between the gall-bladder and the duodenum,—cholecystoduodenostomy. This method imitates to an extent the normal physiological conditions and meets the usual indications of cholelithiasis. The gall-bladder is drained and the bile flows into the intestine when the cystic duct is not obstructed. There is no fistula left. In his own practice the Murphy button has been used four times in making an anastomosis, these cases being in the best

of health a year and a half later. He believes that sufficient time has elapsed to demonstrate the safety of the operation as it is done with the Murphy button, and recommends it wherever the condition of the organ will admit of its use. His four cases were of widely different types, the gall-bladder being enormously distended and œdematous in the first; normal in size, its walls thickened, and containing a purulent fluid in the second; normal, with calculi obstructing the common and cystic ducts, and subsequently falling back into the gall-bladder in the third, and thickened and sacculated in the fourth.

Another point in favor of this operation is the impossibility of a return of gall-stones and the certainty that all the calculi will escape from the gall-bladder. In cholecystotomy it is possible to leave calculi in the gall-bladder, which may occasion considerable trouble. Some one has made the statement that the operation of cholecyst-duodenostomy with the Murphy button favors infection of the gall-tracts; this is not possible, first, because bile, being aseptic and sterile, would, to an extent, overcome this danger; second, because infection with the bacillus communis coli (which is generally found in suppurating lesions of the gall-tracts) is harmless when not confined, as has been amply demonstrated by Naunyn. Up to the present date he has the reports of 34 cases of cholecyst-duodenostomy done with the Murphy button for gall-stones; of this number 1 died, making 33 recoveries and 1 death.

H. Moffatt, of Yonkers, N. Y., ⁵⁹_{Sept. 15, '94} performed cholecystenterostomy with the aid of the Murphy button, on a woman, aged 39, who had some months previously submitted to cholecystotomy. The male button was placed in the colon and the female button in the gall-bladder, the latter being rendered difficult by the presence of adhesions from the previous operation, which bound the gall-bladder firmly down at the bottom of the wound. The patient made a good recovery, the button being passed on the twenty-fifth day. The author regards the button as a most valuable aid in such cases, though the danger of its becoming lodged somewhere in the intestinal tract he does not regard as trivial.

In a case of cholecystenterostomy, recorded by Delbert, ⁹⁹⁶_{Oct. 25, '96} an attempt was made to use Murphy's button, but it was found impossible to articulate the two ends, and anastomosis had to be done by means of sutures.

SURGERY OF BILE-DUCTS.

Maurice Jordan ²⁰⁰⁰_{'95} has collected from literature 72 cases of removal of calculi from the common bile-duct, with 22 deaths. He lays stress upon the fact that, in abdominal surgery generally,

it is often impossible to make an accurate diagnosis, and the surgeon must be prepared to alter the whole plan of procedure at any moment. Thus, if he undertake to explore the gall-ducts for stone, he may find no stone; he may remove one or many gall-stones from the gall-bladder with the greatest ease; he may get at a stone deep in the abdominal cavity, and may have great difficulty in extracting it; he may have to loosen the attachments of the duodenum so as to throw this viscus downward or inward; he may find the stone pressing against the thin layer of pancreatic tissue covering the hepatic duct to the inner side of the descending portion of the duodenum, and may have to cut down on it in that position, or he may have to open the duodenum in front and behind to accomplish his object.

Edwin Ricketts, of Cincinnati,¹⁰¹_{Nov., '96} in reporting three cases, offers the following conclusions: 1. The continual absence of bile in the intestinal discharges does not necessarily signify that there is no operative condition of the gall-bladder existing. 2. The bile may flow periodically, and when this is true symptoms demanding surgical interference are generally present. 3. Jaundice, when present, is very satisfactory evidence of biliary obstruction, although it is not always present. 4. Pain in the region of the gall-bladder, coming on at intervals and in connection with jaundice, or without jaundice, in connection with clay-colored stools, is positive proof of biliary obstruction, and when this is true an operation should be resorted to. 5. Persistent clay-colored stools, with or without severe pain or jaundice, are the most reliable symptoms governing operative interference. 6. When a stone is primarily engaged in the gall-bladder a pathological lesion begins. 7. An obstruction of the common duct to external trauma, such as a blow received over the region of the liver, may produce a catarrhal condition of the common duct amounting to entire stoppage of the flow of bile. 8. A solitary calculus engaged in the lower end of the gall-bladder may cause thickening of the bladder-wall and also periodical escape of the infected or non-infected contents. 9. Calculi may form in the hepatic or common duct. 10. It is important to probe the hepatic duct through the incised bladder in all cases operated upon, whether the condition be catarrh alone or combined with stone.

Operations on the Bile-ducts.

Operations on the ducts have received most attention at the hands of Terrier, of Paris.²_{Mar. 16, '95} They comprise cholelithotripsy, in which the stone is crushed through the walls by means of specially-padded forceps; choledochostomy; choledochendysis,

which is commonly known as choledochotomy and includes Courvoisier's cholelithectomy, and choledochenterostomy. Stones in the cystic duct can usually be pushed out by manipulation, but the duodenal aperture of the common duct is too small to permit this. Cholelithotripsy is risky from the possibility of serious damage to the duct-wall, choledochostomy may leave a fistula, and choledochenterostomy is rarely practicable. Hence, choledochendysis appears to be the best operation here.

McGraw⁹⁶_{Aug., '95} is strongly opposed to the operation of cholecystenterostomy for jaundice caused by calculi in the common ducts, and holds that, though it is easy of performance and gives speedy relief, it belongs to the period of development in the surgery of the gall-ducts and cannot long retain the place which it now holds. The only rational procedure in cases of obstruction of the common duct by stone is, the author holds, removal of the obstructing body. If the patient be so exhausted by long-continued jaundice that a prolonged operation is inadvisable, the surgeon should establish a biliary fistula through the abdominal wall, as that procedure would give as much relief as the operation of cholecystenterostomy, without injuring the intestines or establishing new adhesions within the abdomen.

M. H. Richardson, of Boston,⁵⁹_{Nov. 3, '94} reports two cases of operation for stone impacted in the cystic duct. In both the distended gall-bladder, which could be felt through the abdominal wall, was so tense and so movable as to suggest very strongly a floating kidney. In one case the symptoms were caused by a large stone, the removal of which, owing to its long and firm impaction in the cystic duct, was accomplished only by complete extirpation of the gall-bladder and cystic duct. In the other the stone was detached, after prolonged efforts, through the gall-bladder itself. In both cases a very gratifying recovery followed. A case of the same kind was reported by W. G. Scott, of Newton,²_{July 20, '95} the calculus being removed by incision.

Hans Kehr, of Halberstadt,²⁰⁶¹_{'04} ⁹⁶_{Feb., '95} reports that among 27 laparotomies for gall-stone he has met in 26 cases incarcerated concretions in the cystic duct. The ordinary operation not resulting satisfactorily in 7 cases, he adopted the plan of direct excision of the stone from the duct and sewing up the opening through which it was removed. He had previously operated by suturing the gall-bladder to the abdominal wound and waiting till the back pressure in the cystic duct dislodged the stone. Ordinarily the stone can be removed through the fistula by means of a proper spoon or forceps. In two of Kehr's cases he was unable thus to remove the stone, and therefore opened the abdomen in the linea

alba between the xiphoid process and the navel. Through this opening the cystic duct was easily reached and incised over the incarcerated stone. After the removal of the stone the opening in the duct was closed by a double row of sutures. The outer fistula served as a safety-opening for drainage. In both cases the second operation caused the fistula, which had been a mucous fistula, to become a biliary fistula. It closed in three weeks. In one case the stone became dislodged and moved into the choledochus, and caused the regret that it had not been operated upon while it was in the cystic duct.

When the stone cannot be dislodged by the hand in the abdomen the excision of the stone from the cystic duct should be undertaken. The technique is the same as that of choledochotomy. Cystostomy should always be combined with cysticotomy. The biliary fistula closed in all of the 5 cases thus operated upon. The author has done 49 cystostomies. Of these all recovered that were free from complications,—and the number was 45,—such as suppurative cholangitis, carcinoma, etc.

Christian Fenger, of Chicago, ⁹⁹_{May 23, '95} in reporting three successful cases, calls attention to the danger of pushing the stones floating in the common duct into the hepatic duct and out of reach while manipulating.

W. Russell, of Edinburgh, ³⁶_{July, '95} discusses the advisability of operation in jaundice from malignant obstruction, and expresses the opinion that such an operation is warranted in cases in which the obstruction can be located below the cystic duct. The presence of duodenal lesion does not contra-indicate operation, nor does even clear involvement of the liver, as long as distension of the gall-bladder shows that the hepatic duct is not blocked. The most suitable cases for operation are naturally such as the one reported by him in which the lesion was confined to the head of the pancreas.

A case of dilatation of the common bile-duct simulating distension of the gall-bladder is described by F. H. Edgeworth, of Bristol. ⁶_{May 11, '95}

Monier-Williams and Sheild ⁶_{Mar. 2, '95} report a case of perforation of the gall-bladder following typhoid fever, successfully treated by abdominal section. Aside from the interest from a surgical standpoint, the case is instructive as showing the possibility of confusion with intestinal perforation. And it adds another case to the now somewhat lengthy list of cases of cholecystitis typhosa to which attention has been recently directed by several articles, particularly the one by Chiari. The case is certainly a rare if not a unique one. Something of its positive value is lost by the evident hesitation of the authors to pronounce unreservedly upon the nature of

the febrile affection they had under observation, as well as by the lack of bacteriological investigation. While reasonably sure of their case, they admit "it is open to any one to assert that it was not really enteric fever, but that the suppuration was due to some other cause and the fever to septic absorption and pyelephlebitis."

D'Allocco⁵⁸⁹ records a case of infectious suppurative angiocholitis and cholecystitis with peritonitis and sero-fibrinous pleurisy, due to the coli bacillus and cured by cholecystectomy.

E. M. Foote, of New York,¹ describes the case of a man, aged 28 years, who had had dragging pain in the epigastrium for six weeks, followed by loss of flesh and strength, and there had been jaundice for ten days. The liver extended two inches below the free costal margin and was plainly nodular. Through a two-inch incision made over the outer border of the rectus it was determined that the nodules felt externally were probably malignant. The gall-bladder was shrunken and infiltrated. The wound was closed. The patient reacted slowly from the operation. On the second day he showed signs of peritonitis and died a few hours later. The autopsy showed a general peritonitis. The carcinoma was found in the gall-bladder, liver, pancreas, and transverse colon. The peritonitis was apparently due to the rupture of an abscess in the wall of the transverse colon.

The injection of olive-oil for the removal of impacted calculi, advocated by E. M. Brockbank, of Manchester,⁹⁰ is again brought forward by that author.² It consists in injecting olive-oil or oleic acid, warmed up to about the body-heat, into the gall-bladder and ducts through the fistulous opening. He was led to suggest this method from observations made in 1892 on the solvent action of olive-oil and oleic acid on gall-stones. Both substances are ready solvents of cholesterin and gall-stones. He has only been able to try the treatment in one case, which ended fatally, and in which, on post-mortem examination, the head of the pancreas was found to be enlarged by a cancerous mass which obstructed the orifice of the bile-duct. No calculi were found.

INTESTINES.

Ulceration of the Duodenum.

Etiology.—The literature of ulcer of the duodenum is reviewed by Marmaduke Sheild, of London,² who attempts to show that ulceration of the duodenum after burns was due to septic infarction of the vessels of the duodenum, the gastric juice then acting upon the parts cut off from the vascular supply. He pointed out that duodenal ulcer after burns was rare in the present day on

account of the care with which antiseptics and cleanliness were employed. The predisposing causes of ulceration of the duodenum, especially chronic albuminuria, tuberculosis, and malignant disease, were reviewed. Latent ulcer of the duodenum was shown to be more common in men than in women, and generally to be situated on the anterior surface of the first part of the duodenum. Arthur Latham, in conjunction with the author, adds to the paper a list of the cases of perforation of the intestine at St. George's Hospital during the last thirty-one years. In 8192 post-mortem examinations there were 116 cases of death from perforation of the intestines, and 12 of these were due to perforation of the duodenum; 10 of these occurred in males and only 2 in females. In 9 out of the 12 cases the ulcer was on the anterior surface of the duodenum.

The authors formulate the following conclusions: 1. Perforating ulcer of the duodenum is a rare affection, and far more common in young adult males than in females. 2. In a considerable number of cases the symptoms are primarily epigastric, or referred to the right hypochondrium, or there is a previous history of epigastric troubles. 3. In perforative peritonitis occurring suddenly in a male, if the symptoms are not very typical of implication of the vermiform appendix, the surgeon should turn his attention to the duodenum, where the lesion will most generally be found. The absence of faecal gas or odor in the abdominal contents pointed to implication of the duodenum or stomach. Acidity of of abdominal contents pointed to the same conclusion. A small incision below the umbilicus would clear up the nature of the abdominal contents. 4. The success of the future lies in cleansing the peritoneum by repeated hot-water flushings and drainage of the pelvic *cul-de-sac*.

Diagnosis.—The observations of L. A. Gluzinski, of Cracow, show ³_{Nov. 6, '95} that certain signs indicate the occurrence of intestinal perforation before peritonitis manifests itself. The cardiac and respiratory murmurs can be heard distinctly on auscultation of the abdomen, the phenomenon being due to the presence of intestinal gas in the peritoneal cavity; a more important sign, however, is the modification in the pulse, the beginning of intestinal perforation being marked by an acceleration which is followed within a few hours by slackening. The latter, due to the absorption of putrid gas acting as a cardiac poison, is, apart from its diagnostic significance, of considerable importance from a surgical point of view, indicating the most opportune moment for operation.

Marmaduke Sheild, of London, ⁴⁵¹_{Jan., '95}; ⁶_{May 11} states that the non-feculent and sometimes acid nature of the extravasated fluids and

gas may serve as a most important diagnostic aid, and the incision may be made small, as an exploratory effort only, until this vital point is made clear. When once the surgeon is convinced that the exudation is non-feculent, and especially if it be acid, the region of the stomach and duodenum should be explored without loss of time.

F. Eve, of London, ⁶_{Nov. 10, '94} operated upon a fatal case of perforating ulcer of the duodenum, in which the diagnosis had been rendered difficult by the fact that the man had previously enjoyed perfect health and that his symptoms precisely resembled those of internal strangulation of the small intestine. Vomiting began immediately and was persistent. Pain was referred to the right of the umbilicus, and not to the epigastrium. The fluid contents of the abdominal cavity are described as "purulent faecal fluid."

In reporting some additional cases of perforating ulcer of the duodenum, C. B. Lockwood, of London, ⁶_{Oct. 27, '94} remarks that in one the ulcer was easily and securely closed and the patient's life prolonged rather than shortened, and that the other ulcers could likewise have been closed had they been diagnosed. So far as can be judged in anomalous cases the diagnosis can as yet only be correctly made through an incision. A small exploratory incision through the linea alba above the umbilicus is such a trifling addition to the risks of such cases that it seems to be reasonable in future to try it. The kind of case would be one in which laparotomy had shown that diffuse septic peritonitis existed in the lower abdomen, with no recognizable or probable cause there.

Intussusception.

A number of cases occurring in infants in which laparotomy was performed were described, and the usually large mortality in this class of cases discussed.

Hirschsprung ³⁶⁶_{B. 39, H. 4, '95} personally observed 64 cases of intussusception in children within a period of twenty-one years, and, as in the experience of others, the majority—46 cases—were boys. The youngest child was 49 days old, the oldest between 7 and 8 years; 46 were under 1 year, 9 were in the second year, and 9 between 2 and 8 years. The age at which the trouble occurred most frequently was from the third to the ninth month, more than one-half the cases occurring at this period. Among the 46 infants under 1 year, 39 were exclusively breast-fed. Only 2 were bottle-fed from birth.

E. W. Roughton ⁶_{Feb. 23, '95} reports a case of acute intussusception in a female infant, aged 4 months, in which he performed laparotomy. She had been suddenly seized with pain in the abdomen and vomiting, soon followed by the passage of blood per rectum.

Twenty-four hours after the onset of the symptoms a tumor in the left iliac region was easily felt, and the abdomen was opened in the middle line. On introducing the finger the mass was at once found and brought out at the wound, the invagination extending from the ileo-cæcal valve to the sigmoid flexure. Reduction was effected by kneading from below upward. Rapid and complete recovery ensued. Six months after the operation there was a small umbilical hernia, the result of whooping-cough, but no bulging of the scar. The operator attributes the recovery to the early performance of abdominal section without previous attempts at inflation or injection, and states that cases of acute intussusception have been cured by inflation or injection, and that it is quite possible that this case might have been cured by one of these methods; many cases have been killed, either directly by bursting the intestine or indirectly by the waste of time entailed by unsuccessful attempts at reduction. The fatality of acute intussusception varies directly as the length of time allowed to elapse before reduction is effected. He thinks, therefore, that inflation should be discarded, that injection should be reserved for the very earliest cases, and that immediate operation should be performed in all cases of twenty-four or more hours' duration.

The *Lancet* having demurred from this opinion and expressed that air or fluid injections should be carefully tried previously to abdominal section where the symptoms have been in existence less than forty-eight hours, Roughton reiterated his views, emphasizing the fact that a wider appreciation of the dangers of injection would do much to reduce the mortality of the disease and published the following tables, the first showing the cause of death in 5 cases of laparotomy, the second giving a list of 16 successful cases, the patients in both lists being under 2 years of age and therefore within the period of life when a fatal result is most to be feared:—

CAUSE OF DEATH IN FIVE FATAL CASES OF LAPAROTOMY.

No.	Date.	Surgeon.	Age and Sex.	Duration of Symptoms.	Cause of Death.	References.
1	1877	Beck.	F. 8 mos.	26½ hrs.	Acute peritonitis.	Brit. Med. Jour., vol. i, 1894, p. 346.
2	1882	Marsh.	F. 8 mos.	2 days.	Death two days after operation; temperature, 106.6° F.	St. Bartholomew's Hospital Reports, vol. xxviii.
3	. .	Jacobson.	F. 11 mos.	24 hrs.	Irreducible: operation abandoned.	The Lancet, June 11, 1887, p. 1179.
4	1885	Horsley.	M. 5 mos.	19 hrs.	No shock; died cyanosed; lungs congested.	Brit. Med. Jour., vol. i, 1894, p. 346.
5	1894	Barker.	M. 5 mos.	2 days.	Local peritonitis; temperature, 107.8°	Brit. Med. Jour., vol. ii, 1894, p. 1237.

SUCCESSFUL LAPAROTOMIES FOR ACUTE INTUSSUSCEPTION IN INFANTS.

No.	Date.	Surgeon.	Age and Sex.	Duration of Symptoms.	References.
1	1875	Marsh.	7 months.	13 days (acute 12 hours.)	The Lancet, June 11, 1887, p. 1178.
2	1877	Sands.	6 "	1 day.	The Lancet, June 11, 1887, p. 1178.
3	1881	Godlee.	9 "	4 days.	The Lancet, June 11, 1887, p. 1178.
4	1888	Snowball.	8½ "	24 hours.	The Lancet, Nov. 3, 1888, p. 888.
5	1889	Barker.	F. 5 "	2 days.	Brit. Med. Jour., Feb. 17, 1894.
6	1890	Marsh.	9 "	20 hours.	St. Bart.'s Hosp. Rep., vol. xxviii.
7	1890	Kammerer.	6 "	60 "	Medical Record, 1890, p. 114.
8	1892	Pollard.	6 "	15 "	The Lancet, Oct. 15, 1892, p. 880.
9	1892	Bruce Clarke.	6 "	24 "	St. Bart.'s Hosp. Rep., vol. xxviii.
10	1892	Godlee.	4 "	26½ "	Brit. Med. Jour., Feb. 17, 1894.
11	1893	Lockwood.	8 "	28 "	The Lancet, June 3, 1893, p. 1303.
12	1893	Barker.	F. 7 "	36 "	Brit. Med. Jour., Feb. 17, 1894.
13	1893	Pollard.	F. 7 "	22 "	The Lancet, Feb. 24, 1894.
14	1893	Barker.	M. 4 "	24 "	Brit. Med. Jour., Dec. 1, 1894.
15	1893	Verrall.	6 "	24 "	Brit. Med. Jour., Dec. 23, 1893.
16	1893	Roughton.	F. 4 "	24 "	The Lancet, Feb. 23, 1895.

From this table it appears that the average duration of the symptoms in the successful cases was only thirty-two hours; in no less than 10 of the 16 cases it was twenty-four hours or less, and in only 3 cases was it two days or more. These facts, he thinks, fully justify his contention and prove, as far as they can, that, if laparotomy is to be attempted with any reasonable chance of success, it must not be deferred longer than twenty-four hours from the onset of the disease. He expresses the view that the amount of shock caused by abdominal section in these cases has been confounded with that produced by the disease itself and by the previous unsuccessful attempts at reduction by inflation and injection.

A successful case in an infant of 4 months, operated about twelve hours after the obstruction had shown itself, was also reported by Anderson, of London. ²²
June 12, '96

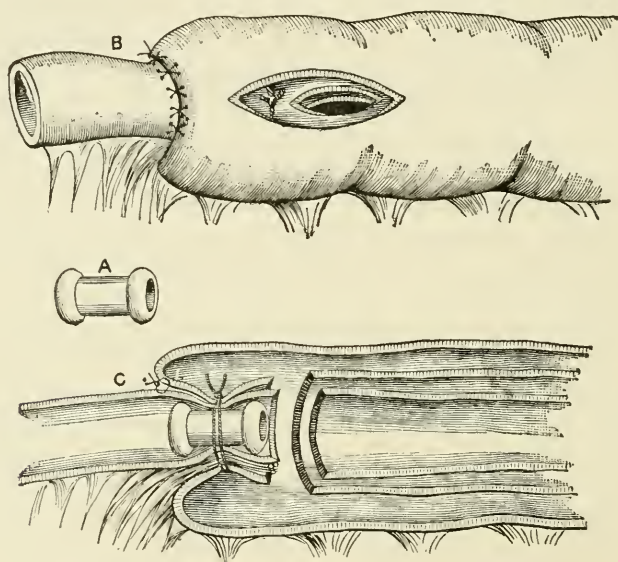
Henry Howitt, of Guelph, Ontario, ²³
Oct., '94 publishes two successful cases.—one, in a male infant, aged 3 months, operated "the second day"; the other, also in a male infant, but aged 6 months, operated about thirty-six hours after the onset of the symptoms. The operator concludes his article by the statement that, in all, 6 cases of intussusception have come under his personal observation,—4 in the infant and 2 in the adult. Three were treated by abdominal section and recovered, and 3 by non-operative means, with one result,—death. He recommends early abdominal section as the best method of treatment to reduce the high mortality in intussusception in early infancy. He advises a small median incision, evisceration, reduction by pressure on apex of intussusception, the intussusciptiens being drawn in the opposite direction, and forcing the contents of the ileum into the colon before returning the intestine to the abdomen.

Rydygier, of Cracow, ³³⁶ ⁴⁵¹ from a study of eighty-four cases of operation in acute intussusception, says that operation should be resorted to as soon as non-operative measures have been thoroughly tried without success. After the laparotomy disinvagination should be attempted before all other methods. If there are any suspicious-looking points on the intestinal wall where rupture may be feared, the peritoneum should be walled off with iodoform gauze or the part drawn out of the abdominal cavity. When disinvagination is impossible, resection of the invagination should be employed, through an incision in the wall of the invaginator. Resection of the entire invagination is to be performed when there are marked alterations in the wall of the intestine and perforation threatens. The formation of an artificial anus and entero-anastomosis have usually no place in acute intestinal invagination. Only in case of collapse is an *anus præternaturalis* made admissible.

In chronic intestinal invagination he advises that non-operative therapeutic measures be employed, but not for more than one week. During the period between the attacks operation is to be advised. After laparotomy disinvagination is to be attempted tentatively. Four successful cases have been reported, —one at the end of nine months, two after six months, and one after ten weeks. If this does not succeed, resection of the invagination should be performed. Entero-anastomosis may be employed when there are adhesions; but there are no indications in chronic intestinal invagination for the formation of an artificial anus.

According to F. T. Paul, of Liverpool, ¹⁸⁷ ^{July, '95} when the abdomen is opened for intestinal obstruction, and an irreducible intussusception is discovered, some form of enterotomy or enterectomy is absolutely necessary. Experience very soon teaches, however, that there is no kind of intestinal obstruction for the relief of which there is only one best method. The varying circumstances of each case should be met by various procedures, and the surgeon should be prepared to meet the many unlooked-for difficulties which appear in almost every laparotomy undertaken for this condition. In the author's opinion cases of acute intussusception in children are a little less fatal under medical treatment than those in which the obstruction is due to other causes. For this reason the majority of them come under the surgeon's hands at a very late stage of the case, and it is, unfortunately, the rule rather than the exception to find them in a state of collapse and totally unfit for an extensive resection of bowel. In such cases it is simply throwing away the last chance of life to attempt anything more than the establishment of an artificial anus or a fæcal fistula. Again, there are other patients in whom the constitutional condition may

be better, whilst the intussusception itself is hopelessly irremediable, from gangrene or some other cause. In such, enterectomy is imperative; and one has to decide, after removing the damaged bowel, whether the patient will have the better chance by immediately approximating the ends or by bringing them out of the abdomen and approximating later. When collapse and gangrene are both present,—and they are generally associated,—few would hesitate in deciding upon the latter course; but when the patients are in fair condition these are suitable cases for immediate approxi-



BARKER'S OPERATION FOR INTUSSUSCEPTION. (PAUL.)

A. Light metal tube, with expanded rounded ends. B. Incisions in the bowel and ligature *in situ*.

C. Diagrammatic section of invaginated bowel, showing position of tube.

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mation, and it only remains to determine which method best fits the circumstances present.

Fortunately, in many patients the condition is less grave, and in these an operation on the lines first suggested by A. C. Barker seems to Paul to be the best. The latter proposes a modification of Barker's method, which may possibly prove serviceable in some cases. When the invagination is short and easily brought out through the incision in the outermost or receiving layer of the intussusception, Barker's operation perhaps leaves nothing to be desired; but when the invagination is too extensive for this and has to be divided *in situ*, the operation certainly has dangers. There are many large vessels in the invaginated mesentery which,

being at the bottom of the wound, are difficult to get at and cannot be readily controlled by sutures as in the slighter cases; also, the tendency which the large stump of mesentery has to retract when the weight is removed is so great that the preliminary sutures are liable to tear out, thus releasing the invagination and rendering it necessary to approximate the ends by another method or bring them out of the abdomen. He therefore proposes that the surgeon should be armed with a short metal tube made of aluminium and shaped somewhat as in the engraving at *A*. The preliminary sutures, very few of which are required, connecting the intussusceptum with the intussusciens and the first incision are made as recommended by Barker; then the returning and entering layers are also respectively incised (see *B*), and the tube, grasped with forceps, is pushed into the position shown at *C*. A stout silk ligature is now made to surround the intussusceptum just above the incisions in it and is tightly tied. Finally, the intussusceptum is cut off below the ligature and withdrawn, and the wound in the outer layer is closed in the usual way.

A child operated upon for obstruction due to intussusception by J. Crawford Renton, of Glasgow, ²¹³_{Apr., '95} recovered without a bad symptom. A successful case in an infant of 4 months is also recorded by J. Bion Bogart, of Brooklyn. ¹⁵⁷_{Sept., '95} A. Carless, of London, ²²_{Aug. 7, '95} operated on a child of $5\frac{1}{2}$ months for double intussusception, death occurring from shock six hours later. Koehler ⁴¹_{Feb. 28} reports a case of intussusception with spontaneous recovery. Death followed two months later from inanition.

Volvulus.

Etiology.—Léon Bérard ¹⁰⁴³_{Oct., '95} reports a rare form of acute intestinal occlusion in which, laparotomy being performed, he found a purplish mass composed of interlaced distended intestine, of a livid hue, glued together by exudations, particularly in the region of the mesentery. Upon freeing this entanglement it was found that one of the loops of this mass, again turned back in a loop, had entered into a rather tight knot formed by a neighboring loop, which appeared to be twisted like a cord. This loop being freed, it was seen that the one retaining it formed a circle, having its two extremities attached one to the other and also to the surrounding loops by peritoneal exudation. These adhesions were destroyed by the finger, as well as a very solid, long and thin band which united several loops of the mass. Three causes of occlusion were thus present,—a twist, a knot, and a band,—the whole occupying a portion of the ileum, probably in the region of old typhoid ulcerations (the patient having had a mild form of this disease a month

previous), and the exudative peritonitis resulting therefrom. The intestine was replaced in the abdomen; recovery was uneventful, and on the fifteenth day the child left the hospital.

Ullmann,¹⁴_{Feb. 13, '96} cites the case of a patient, 18 years of age, who presented symptoms of intestinal obstruction. A tumefaction was felt in the cæcal region, which could not be considered as a faecal mass. Incision of the abdomen proved the existence of a tumor of the cæcum. The cæcum was removed and the intestine sutured in the following novel manner: First, a longitudinal incision five or six centimetres long was made at a point of the upper end of the mesenteric boundary. Through this incision the extremity of the lower end and of the upper curved end was passed, the opening enabling Ullmann to suture the intestinal tunics of these two ends in such a manner that the sutures were contained in the cavity of the abdomen. Then, having established the continuity of the intestinal tube, he closed the provisional lateral opening, through which he had performed the operation, and sutured the abdominal wall. Recovery took place without any hindrances. Examination of the tumor disclosed a band due to a cured tuberculosis, with a beginning lymphosarcoma.

[This statement should be accepted with some doubt. It would seem far more probable that the band was the result of local peritonitis, not infrequently observed in connection with malignant tumors of the bowel.—B. and C.]

A case of acute intestinal obstruction, produced by a band formed by the abnormally attached vermiform appendix, was reported by Mayo Robson, of Leeds,²⁶_{Aug. 1, '95} operative procedures resulting favorably. In a case of the same kind, also operated on successfully, by Dwight H. Murray, of Syracuse,⁵⁹_{Oct. 19, '95} the vermiform appendix wound around a loop of the ileum, over and under, the end of the appendix having passed upward from the back side of the mass between the ileum and the caput coli. The end of the appendix was enlarged and slightly adherent to the ileum by newly-formed adhesions. The constriction was very tight, producing complete obstruction to the gut. It was with difficulty that the appendix could be pulled away from the ileum so that the constricted loop of the intestine could be drawn through the knot that had been tied. When this was done, however, the appendix lay free in the abdominal cavity, the end of it being clubbed, then a narrow portion under the enlargement, and the remainder being of normal size. The appendix was two inches in length and was removed at a point one-half inch from the caput coli.

Pillard,²¹¹_{May 19, '95} showed to the Lyons Medical Society the intestines of a man, 35 years of age, who had died after operation

for intestinal occlusion due to torsion of the sigmoid flexure. Adenot, who performed the operation, had some difficulty in recognizing the sigmoid flexure, which was as large as the entire colon and was twisted upon itself, the pedicle being situated at the beginning of the rectum. It was easily untwisted and from fifteen to twenty litres of fluid and gas evacuated by pressure through the anus. The circumference of the intestine was about forty-five centimetres.

A case of obstruction of the bowels caused by gall-stone is recorded by F. W. E. Kinneir, of Horsham.⁶_{Mar. 9, '95} Enterotomy was performed and the stone removed, but death followed, being evidently brought about by gangrene and paralysis of the bowel, on account of the continued pressure. The author believes that, if operation could have been performed earlier, the patient's life might have been saved. A case illustrating the advantage of early operation is reported by D. E. Walker, of New York.⁵⁹_{Mar. 16, '95} W. Gill Wylie, who operated, removed a stone, two inches long and one and one-fourth inches in diameter, from the ileo-cæcal valve. A Schüle³⁴_{No. 45, '95} also records a successful operation in a case of duodenal stenosis due to a gall-stone.

Treatment.—In the opinion of P. Rhys Griffith, of Cardiff,⁶_{May 25, '95} there can be no question that laparotomy is the indication in all cases after the stage of established peritonitis. Two or three attempts at taxis and manipulation carried out in a "*bona fide* and energetic manner for half an hour or three-quarters" upon inflamed intestines seems to him both irrational and unscientific. Unfortunately the diagnosis of the stage of established peritonitis frequently presents insuperable difficulties. Not long since, in a case of ovariectomy under his care, death, before the post-mortem examination was made, was attributed to septic peritonitis of adynamic type. Not a trace, however, of peritonitis was discovered, the patient having died from cancer of the gall-bladder. Taxis and manipulation in the early stages of obstruction may often relieve strangulation, but there is no evidence that they produce better results than laparotomy in the same stage. In certain cases where the obstruction is due to the presence of a foreign body this method may be commended, but on the whole it seems to him to be a blind, unscientific method which exposes the patient to the veriest chance operations. By the method of laparotomy, on the other hand, an effort is made by an intelligent co-operation of brain and senses (1) to discover the lesion and (2) to remedy it. When laparotomy fails it is generally due to one of the following causes: (1) delayed interference, (2) a pathological condition irremediable from the first, and (3) inability to discover the lesion, —by no means an uncommon occurrence.

[Nothing is said about the contra-indications to laparotomy "after the stage of established peritonitis." There are undoubtedly certain cases where the peritonitis has become so general and the patient's condition so grave that operation can offer no chances of success, and will only hasten death.—B. and C.]

As to how much we can interfere with the mesentery without producing paralysis of the ileum, J. B. Murphy, of Chicago, ⁸⁹ May 23, '95 answers that this depends upon the position of the ligature. The blood-supply is from the mesenteric arteries, and again from the parallel artery, which is not accompanied by a vein. The mesenteric supply may be cut off in the dog for six and one-half inches without causing paralysis or necrosis; but if both vessels are ligated, anything over one-half an inch causes a necrosis. As regards the strangulated and constricted bowel after the twisting, the venous circulation is first disturbed; then damming of the bowel, cessation of the circulation in the mesenteric vessels, and, lastly, in the parallel vessels. The parallel vessel being protected by a cushion of fat, it takes a long time for it to give way. There being no vein to return the blood, great congestion of the bowel ensues; and if sufficient time has not elapsed to cause a thrombosis, the bowel can be placed back into the abdomen after the obstruction has been removed.

When excision of a section of the bowel is necessary, a little more of the gut on the convex side than on the mesenteric side should be cut off, otherwise necrosis of the bowel may follow.

Volvulus of the sigmoid flexure is usually ascribed to retraction of the mesocolon on a level with its parietal insertion. Both portions of the loop thus have a tendency to become approximated and twisted and to retain scybala. To avoid a renewal of recurrences observed in two cases, Roux, of Lausanne, ³³⁶ Sept. 16, '94 sutured the mesocolon to the abdominal wall. The gut must be solidly fixed to the parietes, otherwise it will become detached, as was the case in one of the patients submitted to the procedure.

In a case recorded by Smith and Fleming ² July 20, '95 there had been complete obstruction for a week, attended with the usual symptoms. A diagnosis of volvulus of the sigmoid flexure was made and an operation undertaken for its relief. In opening the abdomen the sigmoid flexure was found to be enormously distended. A fold was brought out of the wound and incised, which allowed of the escape of large quantities of gas. The involved portion of the bowel was brought out of the wound, when one complete twist was manifest. It was deemed best to drain the bowel for a few days, which was accomplished as follows: A piece of rubber tubing about two feet in length and of the calibre of a

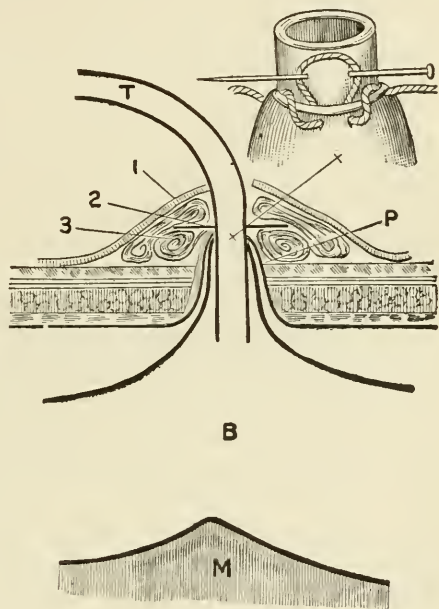
crow-quill was stretched over the point of a probe and introduced into the small opening which had been made to allow the gas to escape. Then a safety-pin was made to transfix the peritoneal and muscular coat of the bowel by the side of the tube and to pass through the side of the rubber tubing.

Intestinal drainage, as an accessory to the operative treatment of these cases, is scarcely inferior, in the author's opinion, to the removal of the cause of the obstruction. The patient, a man of 84 years, made an excellent recovery.

[We do not believe that intestinal drainage is as important as the writer would have us think. It is an additional detail which must prolong an operation in which time is of the greatest importance. In our opinion, the sigmoid flexure can be drained with greater ease and safety by the rectal tube.—B. and C.]

W. Fell⁵⁵⁷_{Oct., '94} ascribes a successful result in an operated case of intestinal obstruction to the facts (1) that the patient had an already damaged, and not what might be called a "virgin," peritoneum, an intact peritoneum being a much more dangerous one to have to deal with than one that has been gradually used to interference by previous and lighter attacks of inflammation (Treves, in his recent lecture on "Peritonitis," lays special stress on this point); (2) that the operation had been performed fairly early, before collapse or fæcal vomiting or an irrecoverable paralysis of the bowel had taken place; (3) that large doses of sulphate of magnesia had been used and opium refused.

A. Morgan Cartledge, of Louisville,⁴⁵¹_{May, '95} reported six operated cases, three of which terminated fatally, demonstrating the hopeless nature of intestinal obstruction unless treated by early lapa-



OPERATION FOR VOLVULUS OF THE SIGMOID FLEXURE. (SMITH AND FLEMING).

Diagram to show method of draining the intestine. B, bowel; M, mesentery; T, rubber tubing; P, peritoneum pulled outward. 1. Strapping. 2. Pin holding tube. On the right (X) an enlarged drawing shows the details of fixation. 3. Dressing.

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rotomy. He considered the practice of masking every abdominal condition characterized by pain with opium as far too prevalent.

Kummer¹⁹⁷_{Feb. 20, '95} emphasizes the importance of relieving the acute symptoms of obstruction, by the establishment of a stercoral fistula without seeking for the actual cause of the impediment, in cases in which the patient is in a state of extreme collapse and exhaustion. The high death-rate associated with exploratory laparotomies for this condition is readily explained by the asthenic state of the patient, brought about partly by the want of food, partly by the severe shock induced by the abdominal lesion, but it is also largely dependent on the absorption of toxic products from the stagnant and decomposing fæces. In the face of such complications it is hopeless to attempt any prolonged or serious operation. If, however, the abdominal distension is relieved by the removal of the retained fæces through an opening made as low as possible, the general condition of the patient may improve sufficiently to allow of a more prolonged search for the cause of the obstruction in a few days, whilst in not a few cases it may suffice to bring about an actual cure or, at the worst, allow the patient to die in comparative comfort.

J. M. Barton, of Philadelphia,¹¹⁵⁰_{July, '95} in a review of the treatment of acute intestinal obstruction, expresses the opinion that the medical treatment is rarely successful, exhausts the patient, wastes valuable time, and occasionally ruptures the intestine. In but a few of the cases seen by him, in which reduction followed any of these methods, less damage would have been done had a clean incision been made at an early stage. If these medico-mechanical methods are tried and are not immediately successful, the abdomen should be at once opened; this procedure should under no circumstances be delayed after the appearance of coffee-ground vomiting.

According to W. Thomson, of Dublin,¹⁶_{Oct. 1, '95} the best means for reaching the site of constriction is to observe the most dilated portion of bowel which presents at the wound, which will probably be also the most congested. This is followed in the direction of increasing distension and congestion, and will lead to the stricture. The manipulation may often be carried out with two fingers. In many cases of extreme collapse, when it is difficult to locate the constriction, Thomson thinks it would be a wiser course to make an artificial anus rather than to increase shock by prolonged interference.

As regards the use of liquids, W. Thornley Stoker¹⁶_{Feb., '95} recommends as a very effective procedure the employment of an ordinary red-rubber tube $\frac{4}{8}$ to $\frac{5}{8}$ inch in diameter, such as is used

for washing out the stomach, for the injection of large quantities (8 to 10 gallons—32 to 40 litres) of warm water in divided quantities. The tube should be marked at 3, 6, and 9 inches from its end to indicate the length inserted, and a large funnel should exactly fit the opposite extremity, slightly dilated for the purpose. The patient lies on his back or left side with the pelvis raised, so as to facilitate the passage of fluid into the sigmoid and descending colon. The surgeon sits on the right of the patient's bed, introduces the end of the tube, and retains it in position with his left hand, while with his right he holds the other end of the tube, into which the funnel is inserted. The tube is introduced 3, 6, or 9 inches, as may be indicated, and should be occasionally moved up and down in the anus by the left hand. An assistant pours water into the funnel, and the pressure may be varied and adjusted by the height to which it is raised by the operator. The left hand can be used at any moment to pinch the tube and stop the flow when the pressure in the rectum becomes painful. When as much water has been introduced as can be borne the funnel is removed, that end of the tube lowered to a basin placed on the floor, and the fluid allowed to run out of the bowel. By repeated operations of this kind large quantities of water may be used, and the bowel emptied without the patient being exhausted by straining or by the necessity of changing his position. The solution of fæces and expulsion of flatus are assisted by the pushing in and out of the tube and by the varying hydrostatic pressure, caused by alternately raising and lowering the funnel at the free end of the tube.

In gall-stone obstruction, F. Eve, of London, ²_{Jan. 19, '96} in reporting a case in which he had performed laparotomy, gives his views with regard to treatment: 1. When a diagnosis is possible expectant treatment should be tried, as one-third of the cases of marked obstruction from gall-stone recover without operation. 2. Operative interference should not be long delayed, as the patients are nearly all aged, the mean age being 64 years. 3. After opening the abdomen the calculus should, if possible, be forced through the ileo-cæcal valve. 4. If the calculus be immovable or at a distance from the valve, and the intestine healthy, the stone should be excised. 5. When the intestine is inflamed and the stone immovable and adherent to it, an attempt should be made to break the calculus up with needles; this failing, it should be extracted, the intestine fixed to the abdominal wall near the wound, and surrounded with iodoform gauze. 6. In only 1 case out of 27 was it found necessary to resect the intestine on account of ulceration. In reporting a successful case of operation T. A. McGraw, of Detroit, ²⁰²_{Oct. 25, '94} expresses himself in favor of early intervention, as it

is probable that death occurs more frequently than is supposed from this cause of obstruction.

Post-operative Intestinal Occlusion.

Rohé, of Baltimore, ⁹_{Oct. 13, '94} interestingly reviewed the literature upon intestinal obstruction following operations in which the peritoneal cavity is opened, and showed that obstruction the result of adhesions caused between 1 and 2 per cent. of the deaths following ovariectomy and other operations. Klotz, for instance, had reported 31 cases of intestinal obstruction, with 5 deaths, in a series of 421 abdominal sections and 148 extirpations of the uterus through the vagina. The author had himself seen a case in which the gut was entirely impervious. The symptoms of intestinal obstruction after laparotomy are essentially the same as those of primary obstruction. As soon as symptoms indicating obstruction appear, Klotz washes out the stomach with from 4 to 6 quarts (litres) of warm salt solution. Should this fail to relieve the symptoms, he repeats the procedure and then passes into the stomach, through a tube, a large dose ($1\frac{1}{2}$ to 2 ounces—50 to 60 grammes) of castor-oil. In all cases so treated the active peristaltic movements set up caused passage of flatus and fæces within ten hours. Rectal injections of water or air may at times be curative when the obstruction is due to intussusception, volvulus, or soft adhesions of the lower portion of the intestine, but when the obstruction is due to cords or bands they can manifestly be of no avail.

Adenot ³⁶³_{Mar. 18, '95} states that a certain number of post-operative occlusions of the intestines are due to the physiological impermeability of the left subcostal angle of the colon. When the small intestine is placed in a plane posterior to the angle of the colon, this angle is not compressed and its permeability is less liable to be interfered with. Catheterism of the rectum with Faucher's tubes may in some cases, whether associated with gases or fluids or not, relieve the strictures. The introduction of a flexible tube is not always feasible, as it may become folded up in the rectum; the rectal sound should be used with great care, so that it may not injure the mucous membrane of the rectum. During a laparotomy it is advisable to displace any portions of the small intestine that may threaten, from their position, to compress the colon at this angle by its distension. It appears preferable to purge mildly from the first to the third days after operation, to prevent the recurrence of a marked meteorism. Meteorism, of itself, is a cause of impermeability of the left subcostal colic angle. If an occlusion should form after laparotomy there should be no hesitation in reopening the abdomen, and in seeking for its origin occlusion of

the left colic angle by the causes just enumerated should not be overlooked.

Among the causes of intestinal obstruction enumerated by J. B. Murphy, of Chicago, ⁹⁹May 23, '96 are paralysis of the muscles, mechanical obstruction, and spasmodic contraction. Of the dynamic variety we have paralysis from operation on the gut. Regarding differential diagnosis, in dynamic ileus careful auscultation of the abdomen will determine the absence of peristalsis, and the presence or absence of peristalsis in early obstruction is of more importance than any one sign or symptom known.

Stumpf, of Munich, ⁸¹⁴Sept. 1, '96 has had occasion to observe two cases of paralytic ileus after laparotomy, in one of which the symptoms of obstruction made their appearance immediately after the intervention. The patient had barely been taken back to bed when feculent vomiting set in, which on the following day increased in frequency until it recurred every five or ten minutes. He vainly resorted to all the measures usually employed under such circumstances, and, ultimately despairing of the case, contented himself with feeding the patient by nutrient enemata, which, curiously enough, were largely retained without great difficulty. From the sixth to the eighth day the grave symptoms gradually improved and the patient was soon out of danger. He is, therefore, of the opinion that, in cases of paralytic ileus it is useless to again open the abdomen, and that copious rectal injections, nutrient enemata, and medical treatment will prove more beneficial than operation. It is absolutely certain that the employment of asepsis, especially by dry means, materially reduces the number of cases of intestinal obstruction.

Zweifel, in eight hundred and fifty operations, in which he had recourse exclusively to dry aseptic measures applied to the abdominal cavity, has only had one case of death from intestinal obstruction. He has several times observed slight symptoms of obstruction, but the patients invariably recovered. He is inclined to think that the nature of the aseptic measures employed has nothing to do with post-operative obstruction, and that the true causes of this terrible complication must be looked for elsewhere.

Ziegenspeck, of Munich, has also had a case of post-operative obstruction in which he re-opened the abdomen, but without being able to detect the cause of the mischief. The patient died, and at the autopsy the obstruction was found to have been determined by the adhesion of a loop of small intestine to the pedicle resulting from ablation of an ovarian tumor. He would, therefore, be inclined, if obliged to reopen the abdomen on account of ileus, to search for the obstacle, in the first place, in

the true pelvis, on the assumption that it will frequently be found to be connected with the pedicle or operative wound.

Tauffer, of Budapest, presents statistics of the cases of ileus which have occurred in his clinic during the antiseptic period and since he has exclusively employed asepsis; during the first period, of 443 operations, 10, or 2.25 per cent., were followed by intestinal obstruction, while during the second period, in 348 operations, he has only had 2 cases, or 0.57 per cent., of this complication.

F. Commandeur ¹⁰⁴³_{Dec., '94} concludes, from two cases reported by him, that, following surgical operations upon the organs of the lesser pelvis, fibrous peritoneal bands form, which may consecutively and even after a long period cause internal strangulation. These adhesions being sometimes multiple, one should not, in cases in which surgical intervention is undertaken, close up the abdomen, after having removed a strangulation, without a methodical examination of the intestine, so as to make sure that there is no other obstacle. This open exploration, notwithstanding the disadvantages attributed to it, should be preferred, as it is the only one admitting of a truly complete examination. In certain forms of strangulation by adhesions the intestine may be partially severed as in strangulation by sharp flexion, which possibility should induce the surgeon to operate early. No case, however, enables us at the present time to judge as to the best line of conduct in such cases.

Legueu, of Paris, ³_{Aug. 21, '95} insists on the value, from a diagnostic stand-point, of a purgative administered the day after operation, thus preventing from the outset the arrest of fecal matter. If operation become necessary, he prefers laparotomy, which must be done early, the region of the primary operation being first explored, and, if nothing be found, the left angle of the colon. Artificial anus should not be resorted to except in cases operated on at a later stage or where no cause for the symptoms can be discovered.

Typhoid Ulcer.

A. Parkin, of Hull, ²_{Jan. 26, '95} in a case of perforation, was able to operate two hours after the symptoms had shown themselves. A purse-string suture being out of the question on account of the friability of the intestinal walls, longitudinal suture only was possible. The patient died three days after the operation. The author remarks: "This case adds one more to the list of 20 such cases which have been operated upon with so far only 1 recovery. There is no doubt that perforation in the course of enteric fever is almost invariably fatal, and any recovery from such

a complication can only be regarded in the light of an accident unless surgical treatment be adopted." Where the author obtained this statistical information is not stated, but the proportion of deaths given is not that presented by general literature up to the time the article was written. Van Hook, ⁹_{v.9,p.591} quoted by Abbe, of New York, ⁵⁹_{Jan.5,'95} collected 19 cases (including 3 of his own), with 4 recoveries. Up to January, 1895, 5 additional cases were reported, with 2 recoveries,—making 24 cases, 6 of which recovered. Even if out of the cases collected by Van Hook 7 doubtful cases are deducted, the correct statistics, as shown by Abbe, were, up to January, 1895, 17 cases, with 3 recoveries. Netschaïeff, ⁸⁵⁹_{p.586,'94}; ⁹_{Dec.1,'94} who reported one of the successful cases included in the above list, concluded that in cases of intestinal perforation during typhoid fever recourse should be had to laparotomy. The chances for recovery are much greater than with the simple expectant treatment. The earlier the intervention, the more favorable the prognosis.

Abbe's successful case, also included in the above statistics, shows under what distressing circumstances recovery may sometimes be obtained. The perforation had taken place two and one-half days before laparotomy was performed. "A median incision below the navel exposed distended coils of deeply congested and greatly inflamed intestine, smeared with sticky lymph. The pelvis and lower abdomen were filled with a collection of foul, purulent, and fetid intestinal extravasation. This was feebly confined by matted coils of intestines, loosely glued together, that broke apart on being touched, but which, being recognized, enabled me to introduce clean laparotomy sponges under the abdominal wall, where a few coils were seen which showed more recent inflammation. Two pints of foul, purulent fluid and thick lymph were cleaned out and the abdomen irrigated with warm and weak sublimate solution, 1 to 20,000, followed by plain warm-water irrigation.

"Search now revealed the cause. The lower part of the ileum showed many thick, oval patches in its wall; their long axes were parallel to that of the gut, and easily identified by touch as the gut was passed through the fingers, and shown also by increased subperitoneal hyperæmia. One such inflamed Peyer's patch showed a gangrenous perforation one-quarter of an inch in diameter, from which intestinal contents were seen to pump out. This was promptly closed by interrupted silk sutures over which two layers of Halsted mattress stitches were placed, these being found to be the only suture that would hold in the tender and inflamed intestinal coat. A large abdominal tamponade of iodoform gauze

was placed within the abdomen and pelvis, and no attempt made to close the wound. A hot black coffee and whisky enema assisted greatly in preventing shock; the patient was put back to bed in three-quarters of an hour from the beginning of etherization. She passed a good night and had a stronger pulse next morning. Pulse, 132; temperature, $102\frac{1}{2}^{\circ}$ F. (39.2° C.); tympanites less. At the end of forty-eight hours after operation, as she was in good condition, except for tympanites, I removed the tamponade, re-applied a loose one, and gave 5 grains of calomel. This produced numerous loose movements and she felt much better. Temperature, $101\frac{1}{2}^{\circ}$ F. (38.6° C.); pulse, 120. A little fluid feces leaked from the wound after the calomel action, showing that the perforation had slightly opened. This continued for two weeks, when it ceased, and the abdominal wound pursued the usual course, closing in rapidly by granulations, and has left a narrow and firm scar." After the third day her appetite improved and a rapid convalescence ensued.

Abbe very justly remarks: "Why one class of cases should be left to die, while we operate on all cases of appendicitis cases when perforation can be recognized, does not appear." The typhoid statistics are improving, and, as it was in the other, we may here also soon record as much gain in the near future. A successful case is also reported by Sifton. ¹⁰⁸⁰ ¹¹⁹ No. 7, p. 368; June 15, '96 An incision four inches long was made, and on opening the peritoneum about a pint of liquid feces escaped. The ileum was seen to be extensively ulcerated, and after a brief search a perforation about one-sixteenth of an inch in diameter was found about two feet above the ileo-cæcal valve. This was closed by two rows of Lembert sutures. The bowels were then replaced and the abdomen washed out as thoroughly as possible. Drainage was provided for and the abdominal wound was closed with an interrupted suture. The case thereafter pursued a slow, but favorable, course.

B. Merrill Ricketts, of Cincinnati, ⁵³ ^{Apr. 8, '96} reports an unsuccessful case performed seventy-two hours after the symptoms of perforation had shown themselves. The fact that notwithstanding careful search a perforation could not be detected, however, relegates the case to one of laparotomy for the evacuation of accumulated pus, with the pus-producing centre untreated. Drainage was insured by "leaving gauze in the lower end of the wound."

Hare, of Charters Towers, Queensland, ³⁶ ^{June, '96} also had an unsuccessful case, the patient dying, eighteen hours after the operation, from general peritonitis, which had existed before operative measures were instituted. This author holds that the sphere of hopeful operative treatment is larger than many suppose, and that too

commonly the mode of treatment tends to so dull the sensibilities that the signs of perforation are never discovered. Since 1886 he has treated (by the cold-bath method) 1200 cases; among these 35 suffered from perforation. The first sign observed was sudden local pain, followed by tenderness, hardness, and immobility (still local), with slight collapse; then vomiting, increased pain, collapse, and all signs of general peritonitis. "The immediate increase in the severity of the symptoms which followed the first attack of vomiting was very frequently noticed," and, assuming this to be due to "a sudden additional extravasation of bowel-contents, it is of immense importance to anticipate the onset of vomiting," and defer it by a full ($\frac{1}{2}$ gr.) hypodermatic dose of morphia, while preparations for operation are being made. Hare finds in most cases that the locality pointed out by the patient as that where the pain began is a good index for the site of operation, and draws attention to the benefit derived from washing out the stomach before operation, and the advantage of incising and draining the intestines.

Appendicitis, Typhlitis, Perityphlitis, Paratyphlitis.

Pathology.—Sahli, of Berne, ¹⁴_{Apr. 17, '95} included under the name of typhlitis all the conditions represented by the above terms,—i.e., an inflammatory process arising in the cæcum, the vermiform appendix, and the surrounding tissues. If the appendix is apt to so frequently become inflamed, it is because pathogenic microbes cannot easily be eliminated from this as from other parts. He agreed with American authors, who saw in the tissues a certain analogy to the tonsils, owing to wealth of adenoid elements. These, in turn, are easily accessible to infection. As the tonsils contained blind ducts that heightened the dangers of inflammation, so the appendix itself was a dangerous blind duct. Autopsies, operations, and exploratory punctures had shown that pus, and not serous exudation, was present, if anything at all could be found,—pus due to a pyogenic germ. Stercoraceous matter cannot be, in his opinion, considered as the direct etiological factor. Thickening of the tissue of the visceral wall, the peritoneum, and transverse fascia, as shown by Roux, were also causes of the stagnation of secreted products. Helferich, of Greifswald, ¹⁴_{Apr. 17, '95} concurs with the views of Fowler that foreign bodies are seldom the cause of appendicitis, the latter author in over 200 laparotomies having only found true foreign bodies in 2 cases. Helferich attributes the disease to a catarrhal inflammation of the mucous membrane, which in turn causes closure of the orifice of the appendix and retention of its contents. The case becomes a serious one when the inflammatory process includes purulence through abra-

sion of the inflamed surfaces by passing fæces. The same views are expressed by J. C. Lange, of Pittsburgh, ¹⁶¹_{Jan., '95}. The inflammatory process is due to infection by the bacillus coli communis, torsion of the appendix also playing an important part in a certain number of cases. Pilliet, of Paris, ¹¹⁵³_{Feb. 6, '95} microscopically examined a series of preparations and concluded that the alterations present could be compared to follicular pharyngitis. The lymphatic follicles of the appendix were hypertrophied and gave the mucous membrane an irregularly swollen aspect, completely obliterating the cavity in certain cases, the contents being muco-purulent.

J. William White, of Philadelphia, ⁸⁰_{p. 385, '94}, ²_{Feb. 9, '95} ascribes the great frequency of this affection to the fact that the appendix is a functionless structure of low vitality, removed from the direct fecal current; it has a scanty mesentery so attached to both cæcum and ileum that it is easily stretched or twisted when these portions of intestine become distended; it is supplied by a single blood-vessel, the calibre of which is seriously interfered with or altogether occluded by anything which causes dragging upon the mesentery. Moreover, there is almost always present a micro-organism—the bacterium coli commune—capable of great virulence when there is constriction of the appendix or lesions of its mucous or other coats.

Czerny, of Heidelberg, ⁶_{May 4, '95} expresses the opinion that acute appendicitis may arise from the presence of the bacterium coli and the chronic form from the tubercle bacillus or actinomycetes.

Walker Schell, of Terre Haute, Ind., ¹_{Apr. 20, '95} states that, next to the ileum, the cæcum and vermiform appendix are most frequently altered by ulceration and gangrene in typhoid fever. Records of post-mortem examinations after this disease show alterations in the appendix in a very large percentage, while statistics indicate that the appendix is the seat of perforating ulcer in from 10 to 30 per cent. of the cases where this lesion takes place in typhoid fever. In one case of appendicitis he operated successfully four weeks after apparent recovery from the former disease, and he concludes that the relation of typhoid fever to anatomical changes in the appendix has not been sufficiently emphasized.

Haenel, of Dresden, ³⁴_{Mar. 20, '95} states that the post-mortem records obtained at Munich fully bear out the generally received idea that the appendix is primarily involved, since in 91 per cent. of the fatal cases the mischief had certainly started within it. As a result, swelling of the mucous membrane, or defective action of Gerlach's valve, combined with increased activity of the contained micro-organisms, accounts for most of the cases. If perforation occur suppuration is sure to follow, and the pus may either be widely

diffused through the peritoneal cavity, or may be encysted within it, or may burrow in different directions in the retroperitoneal tissue. Thus it may point directly backward in the lumbar region, or may run downward under Poupart's ligament into the thigh, or may, again, find its way upward behind the ascending colon to constitute a subphrenic abscess. In rarer cases the pus has pointed in the left side or gravitated into the pelvis and opened into the rectum.

Diagnosis.—J. William White, of Philadelphia, ²_{Feb. 9, '95} states that the symptoms in a case of mild catarrhal appendicitis cannot at present, with any certainty, be distinguished from those marking the onset of a case of the gravest type. In some cases, according to George W. Gay, of Boston, ⁹⁹_{Jan. 3, '95} and as shown by operation or autopsy, there is no localization of symptoms at any time; so that we are compelled to fall back upon the assumption that peritonitis, in the majority of instances, means appendicitis. The diagnosis is made almost certain by the presence of a "bunch," usually situated in the right lower quadrant of the abdomen; but it may be located near the liver or even upon the left side,—in fact, in almost any part of the abdomen. It may be obscured by great abdominal distension or muscular rigidity. Deaver, of Philadelphia, ⁹⁹_{May 23, '95} considers the diagnosis as easily established. Upon palpation a localized point of tenderness can usually be found; this is of great value, but the point of tenderness was frequently referred to the left side. Excruciating tenderness indicates pus. Temperature is not reliable, but a sudden fall indicates perforation. F. W. Goodall, of Vermont, ¹_{Oct. 27, '94} states that quite recently he had been practicing palpation of the vermiform appendix, according to the method recommended by Edebohls, of New York, and he had found that it was not difficult to feel the appendix. On making deep pressure the external iliac artery could readily be located, and then, by following this vessel outward, the appendix was easily detected by the examining finger as a round or flattened band. Keen, of Philadelphia, ¹⁴⁴_{Nov., '94} noticed that if, during the time that a patient is suffering from an attack of appendicitis, he experiences a sudden diffuse pain and presents the other evidences of shock, it is almost certain that an ulcer of the appendix, or an abscess consequent upon the appendicitis, has ruptured into the peritoneal cavity.

Parker Syme, of New York, ¹_{May 28, '95} stated that the temperature was absolutely no guide in determining the severity of the attack. The pulse was about the only reliable guide that we possessed, although the expression of the face also furnished valuable information to the acute and experienced observer.

C. T. Symonds, of London, ²_{Jan. 26, '95} after reporting a series of twenty cases operated by him, pointed out the great value of the presence of slight œdema over the loin as an indication of the presence of deep-seated suppuration. In two cases a large abscess had been completely masked by the abdominal tympanites.

R. T. Morris, of New York, ¹_{May 18, '95} stated that it was sometimes difficult to distinguish between appendicitis and pyosalpinx; they not infrequently occurred together. He thought that the appendix often became infected secondarily from adherent oviducts. In the discussion following this statement W. Evelyn Porter said that in operating in quite a large number of cases of tubal disease he had been surprised at the very variable situation of the appendix. In two cases he had found the appendix attached to the left Fallopian tube and bound up in the adherent mass on that side; in a great number of cases the appendix had been found adherent to the Fallopian tube on the right side. Where there was no evidence of general sepsis it seemed to him often wiser to make no attempt to remove the appendix, as in the effort to do this there was great danger of infecting the peritoneal cavity. J. M. Brook said that he had seen several cases of appendicitis in women in which it had been difficult to make the diagnosis between pyosalpinx and appendicitis. Vaginal examination in one case had shown a mass on the right side behind the uterus, while the menstrual symptoms had pointed rather to a pyosalpinx. At the operation both pyosalpinx and appendicitis had been found to be present. In such a case it was not possible to say before operation just what condition was present.

Hiram N. Vineberg, of New York, ¹⁰⁶³_{July, '95} thinks that the possibility of salpingitis must be kept in mind. In some cases the thickened appendix may be palpated through the abdominal wall. Edebohls, who has given this matter considerable attention, claims to be able to palpate not only the thickened, but also the normal, appendix, particularly in women, in whom the abdomen is less rigid than in men. The feasibility of doing this in a large proportion of cases has been demonstrated to Vineberg's personal satisfaction. In acute cases, however, when the abdomen is very much distended and sensitive, he has only occasionally been successful. "After the appendix is detected it is well to pass the fingers over it a number of times in succession. A more correct impression of its size, outlines, etc., is thus obtained." If a reasonable doubt should still exist, an examination under narcosis should be made. In this examination one should have no difficulty, by palpation, in detecting any enlargement or thickening of the appendix. The uterus and adnexa should also be carefully and thoroughly

examined by the combined method,—*i.e.*, with one hand on the abdomen and with the index and middle fingers of the other hand introduced, respectively, in the vagina and rectum. Even when the diagnosis of appendicitis is quite clear, it is always wise, after the patient has been anaesthetized preparatory to operation, to make a thorough pelvic examination as just outlined.

Routier¹⁴_{Jan.30,'95} states that the variety of symptoms presenting themselves in appendicitis are of such a nature as to often cause hesitation in making a diagnosis. In one patient who had already had five attacks of appendicitis he merely found, notwithstanding the fact that she presented symptoms of a pericæcal abscess, intestinal adhesions and a soft condition of the appendix, which was rather larger than the normal size. In a second case the patient was a young man in whom the only symptom, so to speak, had been a painful spot; there existed a purulent focus containing at least half a pint of pus. In the other two cases, which were very similar, great pain had been experienced in the hypochondrium at the beginning, and when he operated quite a large abscess was found.

H. O. Marcy, of Boston,¹_{Oct.27,'94} cited a case as an example of the many doubtful cases met with. Although, as consultant, Shattuck had almost been inclined to doubt even the existence of an appendicitis, on account of the mild symptoms, it had become necessary to operate two days later on account of the development of urgent symptoms. The appendix had been found completely necrotic.

Sir W. MacCormac¹⁰⁷⁷_{Sept.26,'94} believes that there are cases of appendicitis in which, although the diagnosis be not absolutely certain, it may be quite justifiable, in view of the safety of the proceeding when properly carried out, to make an exploratory incision and examine the condition of the appendix.

F. Haenel, of Dresden,³⁴_{Mar.26,'95} believes that the totality of the symptoms must be considered and the exploring-needle not relied on, since negative results are worthless and positive evidence may be dangerous. When once it has been established that pus is present, the sooner operation is undertaken the better, as the only danger of the proceeding lies in its being delayed too long.

Egbert H. Grandin, of New York,⁵⁹_{Dec.1,'94} in reporting some cases, stated that he selected surgery in these cases because he thought it preferable to perform an aseptic exploratory section and be proved wrong in diagnosis than to wait on nature until an operation is forced upon him after perforation and in the presence of peritonitis.

Tillaux, of Paris,²¹²_{Nov.10,'94} calls attention to the errors in diagnosis

which may arise from displacement of the appendix, and instances a case under his care, that of a man 28 years old, who entered hospital on account of pain in the right iliac fossa. From the fact that only the left testicle was seen in the scrotum, a diagnosis of orchitis and ectopia of the right testicle was made, and on operating for its removal the appendix was found instead of the testicle, being round and as thick as the thumb. The operation was evidently indicated, as the results were excellent, but the diagnosis was erroneous.

Nélaton⁷³_{Jan. 27, '95} calls attention to a form of appendicitis consisting of encysted peritonitis with multiple areas of suppurations, the latter being almost impossible to diagnose. Symptoms simulating intestinal occlusion must always be watched, as he has seen several cases in which a generalized peritonitis due to appendicitis was mistaken for intestinal occlusion or strangulated hernia. The dissociation of pulse and temperature, circumscribed pain and local swelling, and slight meteorism are signs indicating appendicitis, but they may often be misleading.

Atypical Cases.—In a case seen by Leidy,⁹_{Sept. 28, '94} of Philadelphia, on examination of the right iliac fossa, an irregular, indurated swelling was found with a sinus opening in the groin. A hard mass three-eighths of an inch in diameter escaped from the mouth of the sinus and was found to consist of inspissated feces. The symptoms subsided and recovery occurred. In this and two other cases the writer observed glycosuria, the specific gravity of the urine in each case being 1032, 1028, and 1032, respectively.

D. W. Graham, of Chicago,¹¹⁵⁰_{Apr., '95} observed the case of an old woman in whom the appendix surrounded by faecal matter protruded through a fluctuating swelling in the groin, along with an irreducible omental hernia. The organ was drawn out and excised and the patient rallied, but two weeks later she died of interstitial nephritis. In a case operated by H. H. Grant, of Louisville,¹¹⁵⁰_{Jan., '95} the appendix was found almost completely destroyed and an extensive ulcer involved the entire head of the colon, with a perforation large enough to introduce three fingers. The colon was also thickened to one-half of an inch and highly inflamed; some general peritonitis was observed. However, there was no distension nor tympanites. Resection of the entire head of the colon was made, but the patient sank thirty-four hours after the operation. In another case witnessed by the writer the terminal portion of the appendix was entirely free except the adhesions which bound it to the colon, the appendage having in reality been amputated by the ulcerative process. Paul F. Mundé, of New York,⁵⁹_{Mar. 23, '95} reported a case of appendicular abscess in the female

simulating intra-peritoneal or true pelvic abscess. In a case treated by Armstrong, of Montreal,²⁸²_{Dec., '94} the abscess had the following boundaries: below and posteriorly, the true pelvis; laterally, on the left the rim of the true pelvis, on the right the ilium; anteriorly, the bladder and anterior abdominal wall to the level of one inch below the umbilicus; above, the greatly-thickened omentum and the transverse colon, together with the small intestine, mesentery thickly matted together. A prevesical abscess due to appendicitis was reported by Tuffier, of Paris.³_{Dec. 12, '94}

G. A. Wright,⁹⁰_{Sept., '94} in a case of recurrent appendicitis in a child of 12 years, found a rounded mass, which proved to be a caseous lymphatic gland, adhering to the upper and posterior part of the cæcum. There was abundant evidence of old peritonitis, in the shape of adhesions. Recovery ensued. This case is interesting from the fact that recurrent appendicitis is rarely met with in children, and on account of the presence of the mesenteric gland.

Bland Sutton,²²_{Oct. 10, '94} in operating on a case of perforation of a retrocaecal vermiform appendix, found that the tip of that organ was in contact with the under surface of the liver,—a very rare position. It was occupied by an elongated calculus, which the author enucleated with his finger. The appendix was not removed, being too firmly adherent to the gut.

John Homans, of Boston,⁹⁹_{Dec. 13, '94} reported a case of perityphlitic abscess, in a girl 4 years old, in which the appendix was found to be normal,—i.e., neither constricted, swollen, gangrenous, nor perforated. The author offers no explanation for the formation of the abscess.

Bryant, of New York,⁵⁹_{Jan. 5, '95} in a case of apparent appendicitis, in which an exploratory puncture had been made and drainage established, found at the autopsy that the trouble had arisen from a perforating ulcer of the duodenum the size of a small lead-pencil. It was evident that the leakage had run down to the region of the cæcum and become hemmed in by inflammatory products, simulating appendicular abscess. In the sac was found much of the milk and food taken into the stomach during life. Weir, of New York,⁵⁹_{Jan. 5, '95} saw three cases of perforation of the gall-bladder in which the extravasation had taken the course mentioned by Bryant, and formed a tumor in the position of a high appendicular abscess. J. G. Lewis, of Panama, N. Y.,⁵⁹_{Oct. 13, '94} describes a case of perforating appendicitis where death occurred from rupture of the common iliac vein.

A case of recurrent appendicitis followed by hepatic abscess and septic pneumonia simulating acute phthisis is recorded by W.

H. Nuding, of Botkins, O., ⁴²⁶_{Feb., '95} and an interesting case complicated by acute dilatation of the stomach, by Charles G. Levison, of San Francisco, ¹⁴⁷_{Mar., '95}. An operation for appendicitis performed by Charles McBurney, of New York, ⁹⁶_{Mar., '95} was followed by intestinal obstruction. A second operation showed that the wall which had hemmed in the peritoneal cavity from the abscess-cavity had gradually approached the surface and become everted, bulging out just as peritoneum might protrude in a hernia. At one point a distinct ring had formed in the irregularly everted mass. Cicatricial tissue had gone before it and intestine followed; so that an artificial hernial pouch had formed and the intestinal contents had gradually become constricted. The author regarded the case as one illustrating the undesirability of allowing large appendicular abscesses to form at all.

A case of strangulation of the vermiform appendix in an infant 6 weeks old was observed by Drew, ⁶_{May 24, '95} who operated successfully, removing an inch and a half of the appendix.

F. Haenel, of Dresden, ³⁴_{Mar. 26, '95} recommends an incision parallel to Poupart's ligament, and advises always to make an effort to reach and remove the appendix, if such can be accomplished without much difficulty; if it is left, a fecal fistula may persist; but even if this does not close spontaneously, an operation can easily be undertaken for it later on. If the abscess is retroperitoneal, it must be dealt with in a similarly energetic manner and early incisions made into it. Thus, the author is able to report one case of secondary subphrenic abscess cured after opening it above the liver, and also in the cæcal region.

McBurney, of New York, ¹⁰¹_{Sept., '94} states that since cases of appendicitis differ very greatly in character, incisions made through the abdominal wall must be adapted to the requirements of each case. In some cases the appendix can be removed with perfect ease through a very small incision,—say, one and one-half inches in length,—but to apply such a method indiscriminately to the different cases and to adopt a standard incision for abdominal section are useless.

J. B. Murphy, of Chicago, ⁶¹_{Mar. 30, '95} states that when the abdominal cavity has been opened the exact position of the appendix can be found by following the white fibrous bands along the convex surface of the cæcum to the base of the appendix. In all of these cases the field of operation is thoroughly protected by carefully packing with strands of iodoform gauze, retaining the ends outside. The adhesions are separated, the pus sponged out, and the appendix liberated from its adhesions; a ligature is then placed on the appendix and one on its mesentery. In all cases where the peri-

toneal cavity is opened directly, the appendix should be removed. Where the appendix is situated above and behind the cæcum, in close proximity to the liver, the induration can be detected behind the cæcum, and may be reached by pressing the cæcum forward, packing around and opening the abscess, locating the appendix and removing it. Where the abscess is circumscribed in the pelvis, and the appendix is found hanging over the brim or attached to the uterus, tubes, or ovaries, the appendix is located by following the bands on the cæcum, pus sponged, appendix amputated, and a long glass drain inserted.

Miles F. Porter⁹_{Sept. 14, '95} believes that the appendix should be removed (1) when there is no pus; (2) when an endo-appendicular abscess is present; (3) as a rule, when there is a peri-appendicular abscess that requires drainage through the general peritoneal cavity; and (4) when there is general peritonitis without adhesions, with the exception noted. A simple incision should be made and drainage provided in cases with circumscribed abscess, when this can be done without opening the healthy peritoneal cavity. An exception should be made to this rule in cases in which the removal of the appendix will not add to the gravity of the operation.

The first inference from a general consideration of the ileo-cæcal troubles is, according to J. McFadden Gaston, of Atlanta,²⁰⁷_{Dec., '94} that all collections of pus should be evacuated by free incision followed by gauze drainage. Should the appendix be involved in the abscess and already in a necrosed state, it is fair to infer that the canal is closed so that there is no communication with the cæcum, and hence excision is not requisite. If, on the contrary, the appendix is found to be enlarged and indurated without perforation, it should be ligated and removed at once. In suspected cases of appendicitis without the signs of suppuration or the presence of a local swelling or induration, an exploratory operation by a transverse incision above Poupart's ligament, with separation of the muscular fibres, should be resorted to without delay.

At a meeting of the New York Surgical Society⁹⁶_{May, '95} Stimson raised the question whether it was not better practice in certain cases to break down adhesions and institute a definite search for the appendix after an abscess had been opened. The generally accepted idea is that after one attack of suppurative appendicitis sufficient changes were set up in the neighborhood to render the patient exempt from the risks of further attacks. In two cases, however, this was not necessarily the case. One patient, after what had been undoubtedly two attacks of suppurative inflamma-

tion, presented himself for the cure of a resulting hernia, and, on operation, it was found that the appendix was free within the peritoneal cavity, and practically devoid of adhesions. J. D. Bryant and Fowler corroborated Stimson's statement that frequently after an attack of suppurative appendicitis the appendix was fully as capable of originating another attack as formerly.

Wood's experience ¹_{May 18, '96} has taught him that it is not wise to be too radical in cases in which the appendix is firmly bound down. Out of sixty cases that he had observed there had been but one permanent fistula, and this had been due to sloughing of the wall of the cæcum. This could, of course, be cured if the patient would consent to operation.

Broca, of Paris, ⁷_{Dec., '94} considers perforation as the rule in recurrent cases, the danger lying in the fact that this adhesion ruptures, often without giving any sign, and the patient dies of subacute peritonitis. Broca has observed several instances of this kind in patients supposed to be cured of one or more attacks of appendicitis, either non-suppurating or not treated by operation.

Prognosis.—Haenel, of Dresden, ³⁴_{Mar. 26, '96} states that diffuse peritonitis is the cause of 70 per cent. of the deaths from appendicitis. He makes a distinction, as does Mikulicz, between the diffuse septic form of the affection and the progressive fibrino-purulent form, the prognosis being much worse in the former than in the latter.

Aufrecht ¹¹⁶_{May, '96} holds that where spreading cellulitis exists behind the ascending colon surgical interference is essential; that in cases of acute peritonitis surgical treatment holds out very little more hope of success than internal medical treatment; that in simple cases of paratyphlitis surgical interference appears to be unnecessary unless distinct evidence of fluctuation can be obtained.

Indications for Surgical Intervention.—According to A. A. Bergmann, of Riga, ⁶⁹⁶_{Oct., Nov., '94} ⁹⁹⁶_{Feb. 25, '96} the majority of the cases of perityphlitis recover without operations, but surgical intervention is indicated (1) when there already exists peritonitis, this being the result of a large perforation of the appendix or gangrene of the latter; (2) when a more limited perforation has caused the formation of an intra-peritoneal abscess; (3) when the attacks of perityphlitis are repeated, which is due to a chronic catarrhal condition from the same cause, together with ulceration of the appendix and a stercoral stoppage in the cavity of the same. The author's cases belonged to the third category; the resections were made during the favorable intermediate time between the perityphlitic accesses, and were followed by complete recovery.

W. G. Gay, of Boston, ⁹⁹_{Jan. 31, '96} points out that about half of the cases may be considered as requiring surgical treatment (1) when

the symptoms commence acutely, indicating perforation or gangrene of the process; (2) when in moderately severe cases there are no sure and marked signs of improvement on the third or fourth day; the passage of flatus is looked on as a sign of the greatest value, no patient being considered safe until this has occurred; (3) in slight cases if the symptoms of improvement come to a stand-still; (4) when frequent exacerbations or relapses occur; two attacks at short intervals would be considered a sufficient justification for interference; (5) cases of doubtful diagnosis in which the symptoms do not subside within a reasonable time; these, however, may be subjected to exploratory incision, with the expectation that more good than harm will be done in the long run. Conversely, operation is contra-indicated in slight cases and those of moderate severity that show signs of improvement by the third day; whilst it is never advisable to operate on patients in a state of profound collapse.

Murphy ⁹_{Jan. 5, '96} holds that every case of appendicitis, promising or unpromising, should be treated by surgical operation at the earliest possible moment, this opinion being based upon 194 cases, with a mortality of 9.6 per cent. He would not delay operating in a case that might be progressing favorably, and, on the other hand, would not shirk the risk of operating on the most dangerous cases.

J. William White, of Philadelphia, ²_{Feb. 9, '95} states that at present operative interference is indicated in every case in which the onset is sudden and the symptoms decidedly acute and severe, and in every mild case in which the symptoms are unrelieved at the end of forty-eight hours or if at that time they are getting worse.

An operation is certainly indicated whenever a firm, slowly forming, and well-defined mass is to be felt in the right iliac fossa, or, on the other hand, when a sudden increase in the sharpness and diffusion of the pain points to perforation of the appendix or breaking down of the limiting adhesions. Operative interference offers some hope of success in the beginning of general suppurative peritonitis, but is useless in the presence of general peritonitis with septic paresis of the intestines. Several attacks of recurrent appendicitis of a mild type may be followed by complete and permanent recovery, but it is at present impossible to distinguish these cases from those in which the appendicitis does not tend to spontaneous cure. Operation is indicated when the attacks are very frequent.

K. G. Lennander, of Upsala, ²⁰⁸⁵_{'96} published a record of sixty-eight cases of appendicitis treated surgically in the course of five years, in which he declares himself as opposed to the indiscriminate

resort to operative interference which has of late been advocated in the United States. By rest, a much-restricted diet, and opium the severity of appendicitis may, it is stated, be often diminished and a complete cure may sometimes result. He would recommend operative treatment in severe cases in which diffuse peritonitis is threatened, and in apparently mild cases in which the symptoms do not yield to medicinal and expectant treatment. He recommends interference in cases of relapsing appendicitis.

Joseph D. Bryant, of New York, ⁶¹_{Nov. 3, '94} believes that prompt surgical interference in the interval of attacks of appendicitis is an advisable and safe procedure, and that the physical characteristics of the local changes define quite clearly the situation of the appendix and indicate with much certainty the prognosis of the case.

Treves, of London, ²_{Mar. 9, '95} stated that a large series of cases should show that the number of instances in which there is only one attack is much greater than that in which there have been several attacks. In a certain proportion of the examples of a single attack there has been an abscess, and the great majority of subjects who have passed through the stage of suppuration are thereby rendered free from any further attacks. The cause of the trouble has been removed by the suppurative process. The operation, in the absence of adhesions, was most simple.

Albert Mathieu ¹⁰⁰_{Dec. 18, '94} calls attention to several facts furnished by Sonnenburg in a recent publication. This surgeon, in 57 cases of simple appendicitis, or perforative appendicitis without generalized peritonitis or any other complication, found in 52 of them an appendicular perforation with abscess of the surroundings. In 80 cases operated upon 20 of the patients had previously presented at least one previous attack of perityphlitis. These facts are of a nature to awaken doubts concerning the value of certain cases of recovery under medicinal treatment, and to verify them it would become necessary not only to carefully watch the patients, but to establish the exact proportion of recurrences in cases of appendicular perityphlitis thus treated.

Benj. Ward Richardson ³⁸_{31 Q. '94} states that, some time since, he advanced the view that stercoraceous vomiting in cases of obstruction of the bowels was a sign for surgical interference. This view was opposed by Gairdner, of Glasgow, who had seen recovery without operation in such a case. To show the correctness of this opinion Richardson, who had never seen an instance of this kind, now records a case in which stercoraceous vomiting occurred, but which was relieved by natural methods.

The statistics presented by Kümmel, of Hamburg, to the

German Society of Naturalists ¹⁴_{Oct. 6, '95} show fifty-one cases of recurrent appendicitis operated on during the intervals between the attacks, with but one death. He has become much more conservative about operating during an acute attack, but recommends operation in recurrent cases as soon as the attacks increase in frequency and become serious in character. He has come to the conclusion that there is no distinction between simple appendicitis and appendicitis with perforation, the latter being less a perforative process than a septic phlegmon, in which the streptococcus plays the principal rôle.

If the pain, tenderness, and other symptoms in a case of appendicitis do not abate within twenty-four to thirty-six hours after free purgation with Epsom salt, Carpenter, of Philadelphia, ¹¹⁹_{Aug. 31, '95} considers it no longer a medical case, and urges that no time be lost in securing surgical aid and removing the appendix.

J. B. Wheeler, of Burlington, Vt., ¹_{Nov. 3, '94} earnestly recommends prompt operative interference as the safest and best treatment for appendicitis, while Steele ¹¹⁵⁰_{Apr. '95} supports a plea of the same kind with the statement that the mortality is less than 8 per cent. during the first week and over 17 per cent. during the second week in cases operated upon.

Richelot ¹⁷_{Jan. 12, '95} declaims against the practice of temporizing in cases of appendicitis, and urges immediate operation when suppuration is evident or even probable.

W. Easterly Ashton, of Philadelphia ¹²¹_{Dec., '94} also contends that all cases of appendicitis, whether acute, chronic, or relapsing, should be operated upon as soon as the diagnosis is clear, but that operative interference is not advised, in any case of appendicitis, in the absence of a thoroughly competent surgeon. In the opinion of William Osler, of Baltimore, ⁸⁰_{Dec. 15, '94} too many appendices are removed, and the operation for appendicitis is passing through the excessive stages through which operations upon the tubes and ovaries had passed a few years since. He recalled the results of a large number of post-mortem examinations made by him in which persons died of other diseases than appendicitis, but in whom evidences of appendicitis having previously existed were present, proving that acute appendicitis could occur with entire cure without operative interference.

Treatment.—McBurney, of New York, ⁵⁹_{Mar. 30, '95} gives a summary of his method of treating cases of diffuse septic peritonitis resulting from appendicitis. A good-sized incision is made parallel to the outer border of Poupart's ligament, the peritoneal cavity opened, and as much of the contained fluids removed by sponges as possible. The appendix is sought for and removed, and any

further collections of fluid, either in the pelvis or among the coils of intestines, looked for and removed by means of a sponge set on a handle. The cavity is then thoroughly washed out with saline solution and drainage provided for by inserting a glass tube into the pelvis with a capillary gauze drain within it, and by packing in various lengths of gauze, if considered necessary, among the intestines. The wound is left open and no suturing of any kind attempted. Nutrition is maintained by the rectum for a day or two. The deep packing of the wound is not disturbed for three or four days and may often be left longer. Up to the date of the paper twenty-four cases had been dealt with by the author in this way, and of these fourteen had recovered.

In the discussion which followed this paper Abbe concurred with the conclusions arrived at by the author, and had himself been able to save three out of seven cases of this nature dealt with in a similar way. He emphasized the importance of withdrawing the gauze plugs by a rotary movement, rather than by direct traction, as giving rise to less pain and of reviving the patient from the shock of the operation as early as possible by the administration of an enema of hot coffee or whisky.

M. S. Kakeles, of New York, ^{July 6, '95} also obtained a recovery in a case of diffuse septic peritonitis occurring as a result of appendicitis. The protecting wall of inflammatory adhesion was sufficiently incomplete as to allow the septic process to extend upward toward the liver, and the whole right abdominal cavity from the liver down into the pelvis was thus filled with purulent fluid mixed with feces. The gut was found perforated at its junction with the appendix, through which feces and gas escaped, and the appendix itself was so gangrenous at its attachment to the cæcum that the operator thought it hazardous to remove it and left it in. Dry sponges were used instead of sterilized water. The operation was performed in a tenement house, with all the unhygienic surroundings usually met with in such abodes. Parker Syms, of New York, ^{May 18, '95} also obtained a recovery in a case of acute gangrenous appendicitis with perforation and general suppurative peritonitis. In this case the appendix was removed.

H. Russell Nolan, of Queensland, ^{Dec. 16, '94} states that in cases of peritonitis which are treated medicinally there is no sudden cessation of the symptoms, and that the comparatively few cases which recover do so gradually. In two of three cases reported by the author all the symptoms of acute peritonitis disappeared as if by magic after the operation. The temperature fell; the abdomen became soft, and the pain almost entirely disappeared; the tongue became moist and the face less anxious-looking,—all in the space

of a few hours. He considers this alone as strong argument for opening the abdomen and washing out the cavity and, if necessary, inserting a drainage-tube in acute peritonitis, especially when by this means a fatal condition may be disclosed and remedied which before may have only been suspected.

The methods of dealing with the stump at present employed are, in the opinion of several surgeons, far from perfect. *Dawbarn* ¹⁰¹_{v.8, No.8} recommends the following technique: 1. A continuous Lembert suture of silk is made to surround the appendix, running like a purse-string or gathering-string, in the superficial layers of the cæcum, one-fourth inch from the appendix. This suture is not yet tightened, although the first half of a surgeon's knot is already made. 2. The appendix is divided, leaving a stump of variable length, but never shorter than a half-inch. 3. This stump is stretched for a moment gently by introducing through its calibre a closed pair of slender, mouse-toothed forceps, passing them into the cæcum, and gently opening the blades; thereby any stricture from swelling of mucous membrane or from plastic deposit will be stretched, and the next step will be the easier in consequence. 4. The stump is seized at the extreme of its free end by a similar fine-pointed pair of mouse-toothed forceps and the stump is promptly invaginated,—turned “outside in,” as a glove-finger might be; so that, when completed, the forceps and appendix-end are one-half inch inside the cæcum. 5. The suture is now tightened, during which step the forceps are withdrawn. Sometimes it is a help to insert a probe or grooved director between the open jaws of the forceps prior to withdrawing the latter, in order to prevent the appendix drawing itself out again with them. Two points in the technique should be noted,—the use of dry sterile gauze to hold the viscera, to prevent slipping, and pressure of the thumb and finger upon the cæcum near the appendicular attachment, to prevent the escape of fæcal contents during the manipulations.

George M. Edebohls, of New York, ⁵_{June, '96} states that in order to minimize the obvious danger of infective peritonitis the stump of the appendix is treated in a variety of ways with a view to its disinfection, such as the actual cautery, the application of caustics and strong antiseptic solutions, etc. In whatsoever manner treated, however, the stump remains as an excrescence upon the peritoneal surface of the caput coli, with the chances of adhesions to neighboring coils of intestine as well as the other undesirable possibilities pertaining to all stumps left within the peritoneal cavity. To eliminate these drawbacks the writer also recommends inversion of the appendix, which consists in inverting into the lumen of the

large intestine either the entire appendix or any part of it remaining attached to the caput coli; so that the appendix, or what remains of it, instead of being free in the peritoneal cavity is now free within the lumen of the bowel. The mucous lining of the appendix thus inverted becomes the external coat, and its former serous covering lines the new lumen, along the whole extent of which it lies in contact with itself. The mouth of the inverted appendix, on the peritoneal aspect of the caput coli, is closed by suture to prevent re-inversion of the inverted appendix. If the whole appendix be pretty uniformly thickened, the entire organ should be inverted without opening its lumen at any point. If unequal thickening or stricture of the appendix, with distension of the distal end, should prove a mechanical obstacle to inversion of

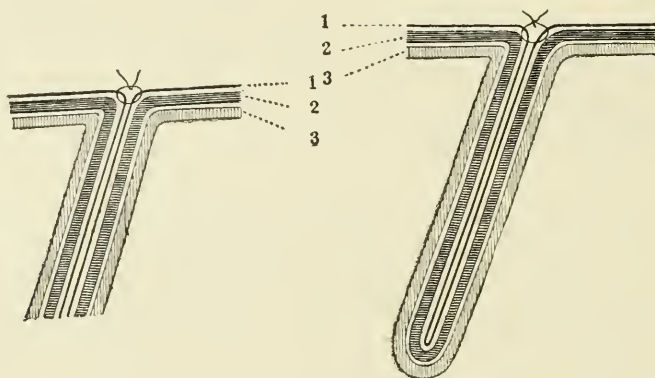


FIG. 1.

FIG. 2.

INVERSION OF APPENDIX. (EDEBOHLS.)

Fig. 1. Inversion of stump of appendix without ligation; peritoneal mouth closed by suture. 1, peritoneum; 2, muscularis; 3, mucosa. Fig. 2. Inversion of entire appendix; peritoneal mouth closed by suture. 1, peritoneum; 2, muscularis; 3, mucosa.

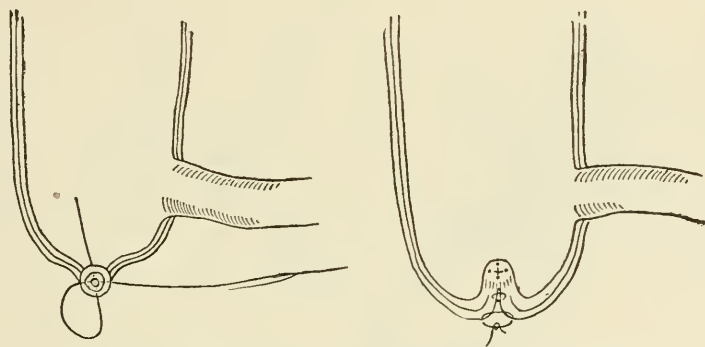
American Journal of the Medical Sciences.

the entire appendix, then the stump left after amputation of the distal end should be inverted *without ligation*. The fæcal fistulæ following operations for chronic appendicitis, in which ligation of the appendix had been practiced, might have been averted by inversion of the appendix. (See illustrations.)

C. E. Ruth, of Keokuk,¹¹⁵⁰_{July, '95} also recommends inversion, arguing that no part of the appendicular stump should be ligated in a manner liable to cause possible strangulation leading to slough. He cuts off all coats in healthy tissue on the same level and transfixes the stump with two crossed sutures near the margin, which perfectly closes the end and causes a close approximation of all its coats, as shown in the wood-cuts. Inversion is then practiced, which brings the serous surface in contact throughout the extent

of the inverted tissues. As many re-enforcing rows of fine-silk or silk-worm-gut sutures may be introduced as desired, without the remotest possibility of a slough exceeding more than enough to separate the innermost sutures, which are already within the lumen of the intestine. The re-enforcing sutures may be of catgut if the surgeon is sure that they will hold well for five days. This plan takes a few moments longer than simple ligation *en masse*, but is more rapid than the cuff-forming plan. Inversion of so small a canal causes complete collapse of its walls and causes the inner and smallest mucous coat to surround the stump at all points, effecting a complete approximation of the formerly external, but now internal, serous coat.

Arthur E. Barker, of London, ²_{Apr. 20, '95} recommends a method of dealing with the stump which simplifies the procedure considerably



NEW METHOD OF DEALING WITH THE STUMP. (C. E. RUTH.)

Mathews's Medical Quarterly.

while saving much time,—an item of great importance in these cases. He noticed in removing the appendix that the greatly thickened and sclerosed mucous and submucous coats were comparatively loose within the other outer coats of the process close to the cæcum, and that after circular division of the latter they could be drawn out of them to the extent of an inch or so in an unbroken tube. Noting this, he put in practice the following measure: “In any case in which the appendix has been separated from its surroundings, its mesentery is first transfixed and tied in one or two parts with fine silk. The little mesentery is then cut with scissors up to the base of the appendix, close to the cæcum. Then, at about three-fourths of an inch from the latter, the serous and muscular coats are divided by a circular sweep of a sharp knife, leaving the mucous tube intact. The latter is now gently drawn out and the two outer coats are stripped back toward the

cæcum with a director and turned over like the sleeve of a coat. In this way the tube of mucous membrane can be reached at its point of exit from the cæcum and is tied with a fine-silk ligature and so closed. Then it is cut across an eighth of an inch beyond the ligature and immediately retracts. The outer tube of serous and muscular tissue is now turned down over the stump of the mucous coats, which has retracted toward the cæcum on being divided. This tube, formed of the outer coats, is then, instead of being stitched, simply surrounded with a fine-silk or gut ligature and closed over the mucous stump. The serous surfaces are not by this means brought together; but this is not necessary and

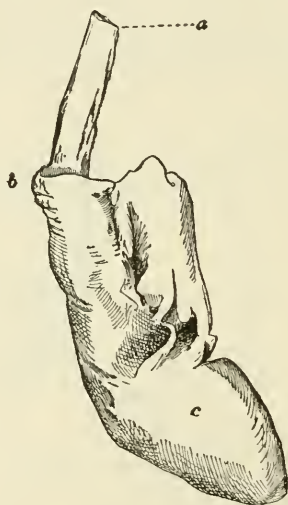


FIG. 1.

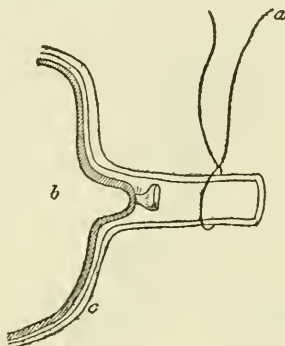


FIG. 2.

NEW METHOD OF DEALING WITH THE STUMP. (A. E. BARKER.)

Fig. 1. *a*, tube of mucous membrane drawn out of stump; *b*, divided edge of two outer coats; *c*, swollen end of appendix. Natural size, from a photograph. Fig. 2. *a*, ligature around the tube formed of outer coats; *b*, cæcum; *c*, mucous membrane, muscular and serous coats.

British Medical Journal.

perhaps not even desirable, according to the author, as no firmer barrier to the prolapse of the mucous membrane could be made than by bringing the raw, inner, non-serous surfaces of the tube into contact." (See illustrations.) The seven cases in which this procedure was adopted recovered.

W. S. Halsted, of Baltimore, ⁷⁶⁴_{Nov., '94} gave details concerning the treatment of the wound in cases of appendicitis at the Johns Hopkins Hospital. Gauze is used not only for drainage, but quite as much to stimulate adhesions between the coils of intestines which surround it and thus effectually shut off the general peritoneal cavity from its infected portion. It is gently packed about the stump of

the appendix and should reach into every recess of the pus-cavity. Whenever pus is encountered, either within the appendix or outside of it, the wound is drained. Sometimes one or two narrow strips of gauze are sufficient and sometimes many broad strips are required. Ordinarily all of the gauze is brought out at one point and between stitches. The abdominal wound is sewed up tight about the gauze, so tight that it is sometimes necessary to cut one stitch in order to remove the packing. When the abscess is a large and ramifying one, or when there are several abscesses, the gauze packing may be brought out of the abdomen at more than one point in the wound.

Mattress-sutures are used to close the wounds, but they are not always buried as they are in completely closed wounds. When they are not buried the stitches are prevented from cutting into the skin by pieces of rubber tubing or of gauze. All of the divided tissues (the peritoneum excepted) should be included in each stitch unless the stitches are buried. Inasmuch as the muscles retract unevenly, the sewing is sometimes a difficult task. If the stitching is executed with care and sufficient care is exercised to avoid infection of the stitches as they are being introduced and tied, there is little, if any, danger that hernia will ensue. Wood¹_{May, '95} states that the Mikulicz drain, consisting of a bundle of lamp-wicks, is very valuable in these cases and an exceedingly potent means of producing drainage. The edges of the wicks are placed so as to radiate in every direction.

Warbasse, of Brooklyn,¹⁵⁷_{Apr., '95} observed a case in which an iodoform dressing caused a rapid pulse-rate.

H. S. Durand, of Rochester,¹_{Mar. 16, '95} criticised the method of making a very short incision in abdominal operations, especially in those performed for appendicitis; also the want of careful attention by some operators to cleanliness of the hands. Apparently insignificant factors sometimes decided the course which a wound would take. After the wound had been closed the author's custom was to take a piece of *crêpe lisse* sufficiently large to cover the wound two or three folds thick, and furnished with a double row of ordinary dress-maker's hooks securely fastened to the *crêpe*.

A case of ulcerative appendicitis, in a man whose vital powers had become greatly reduced, terminated fatally upon the operating-table in the practice of Chandler, of New York,¹_{July 6, '95} surgical measures having been resorted to tardily. The author stated that the results of the autopsy had corresponded very closely with those found in cases of death from ether,—the anæsthetic administered. F. H. Wiggim, of New York,¹_{July 6, '95} had noticed that patients with abdominal sepsis bore anæsthetics badly.

Colon.

Demons, of Bordeaux, ¹⁴_{Oct. 21, '94}, in reporting two cases of cancer of the colon, states that the diagnosis is often very difficult. The total removal of the diseased intestine and the uniting by

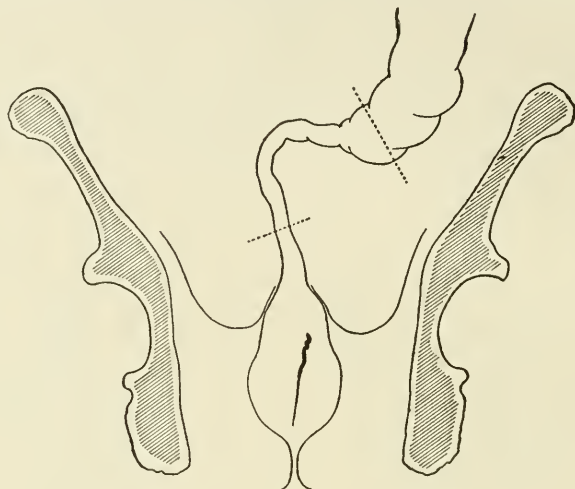


FIG. 1.

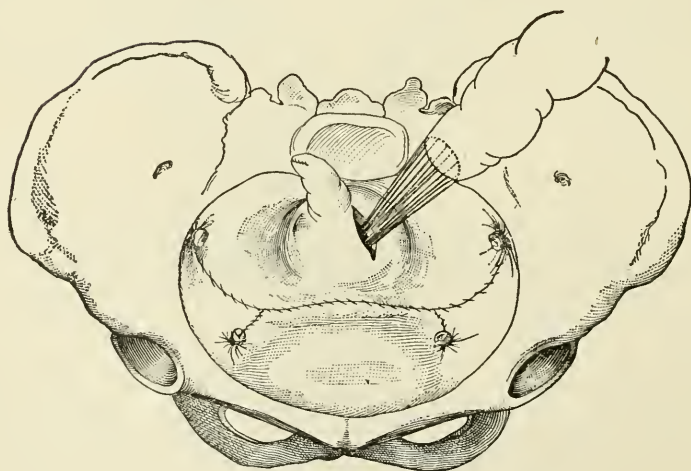


FIG. 2.

SIGMOID PROCTOSTOMY. (KELLY.)

Fig. 1 shows the area of strictured bowel and the portion excised between the dotted lines. Fig. 2 shows the strictured rectum closed and the incision made in the bowel on the pelvic floor. Traction-sutures have been placed in the sigmoid flexure and drawn through the rectum.

Johns Hopkins Hospital Bulletin.

suture of the two intestinal rings that have been divided is the result to be aimed at in operation.

Howard Kelly, of Baltimore, ⁷⁶⁴_{Feb., '96} ¹¹⁵⁰_{July} describes an interesting case of sigmoid proctostomy in a young woman who had been

operated upon some time before by a surgeon for the relief of suffering due to chronic pelvic peritonitis. After removing some of the diseased structures it was found that the rectum had been mistaken for the left Fallopian tube and was divided. Both ends were brought out at the lower end of the wound and sutured there. It was to relieve this condition that Kelly performed sigmoid proctostomy. The operation consisted of separating the adhesions, tying off the open end of the rectum, and passing the sigmoid end of the bowel into a slit made in the rectum below the occluded end. The sigmoid was pulled through the slit and secured by sutures held outside the aperture by being fixed in a bite of a pair of forceps. Union took place without any internal suturing and the patient recovered. The accompanying cuts illustrate the condition and the operation.

Littlewood,⁶ Oct. 13, '94 of Leeds, in a case of malignant disease of the ascending colon producing intestinal obstruction, performed typhlotomy, and subsequently colectomy, suturing the bowel by Halsted's method. This case illustrates in a striking manner the uncertainty which attends the prognosis as to the duration of life after

excisions of the bowel for malignant disease, even when the operation has apparently been very successful. The growth was removed a few days after the patient had been admitted to the infirmary for the relief of obstruction of the bowels caused by it. An early favorable moment was taken, when the patient had recovered from the effects of the obstruction, and, after careful preparation, the whole of the local growth was removed. Secondary growth, of which there was no evidence when the colectomy was performed, proved fatal five months later.

Henry Morris, of London,⁶ Apr. 27, '95 reported two cases in which simulation of movable kidney attended malignant affections: (1)

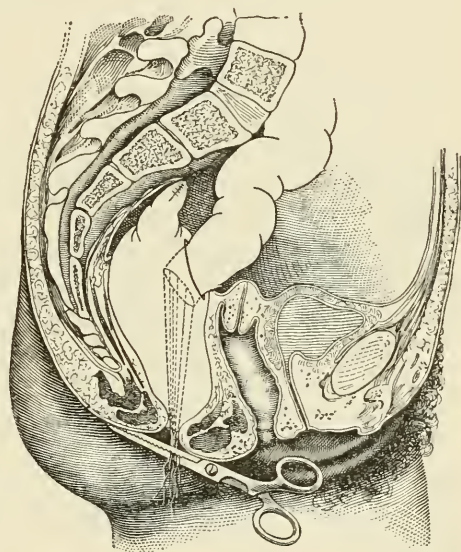


FIG. 3.

SIGMOID PROCTOSTOMY. (KELLY.)

Fig. 3. Sagittal section, showing the sigmoid end drawn into the rectum and held in place by forceps clamping the traction-sutures across the anus.

Johns Hopkins Hospital Bulletin.

a case of malignant disease of the ascending colon mistaken for movable kidney and causing a large perinephritic abscess, and (2) a cancer of the descending colon simulating movable kidney in front of a perinephritic abscess. Anderson ²²_{Jan. 9, '95} saw a case of carcinoma of the colon which simulated hydronephrosis. Edmund Owen, of London, ⁶_{Apr. 27, '95} published an interesting case to show the diagnostic association between cancer of the colon and floating kidney. A cancer in the middle part of the ascending colon gave rise to dull achings and pains which the patient almost certainly associated—at first, at any rate—with his kidney; and as the mass developed the bowel became more and more loaded and distended, the lumbar achings increased on account of pressure upon the psoas and the lumbar nerves. This pressure was especially felt by the genito-crural branch, and the patient complained of pain shooting into the groin and into the region of the cord and testis. Had these symptoms been associated with blood in the urine they might have suggested the presence of a renal calculus, but there was no history of hæmaturia.

Bérard, of Lyons, ²¹¹_{July 28, '95} describes a case of malignant tumor of the ascending colon in which Poncet operated, establishing an ileo-cæcal anus. The patient lived for five years after operation, without much discomfort.

Israel ⁴_{Feb. 4, '95} reported a case of carcinoma of the colon, in a woman of 84 years, in which no recurrence had taken place sixteen and one-half months after the operation, when the patient died of pneumonia. At the autopsy a linear scar was found in the transverse colon, showing the point of resection. There was no stricture, and the intestine, mesentery, and glands were free from carcinomatous growth.

Rose ¹⁵_{Aug., '95} records a successful case of enterectomy for cancer of the transverse colon by Maunsell's method. The patient complained of pain, flatulence, the appearance of a hard swelling to the left of the umbilicus, loss of appetite, dyspepsia, and constipation. At the operation the bowel was occluded above and below the tumor by Makins's rubber-covered clamps and the mass, together with a V-shaped portion of the mesocolon, excised. The operation lasted an hour and twenty minutes, the patient suffering considerably from shock, but recovering and leaving the hospital one month after operation. The author is impressed with the usefulness of this method and regards chromicized catgut as the material best adapted for the stitches.

W. S. MacLaren, of Litchfield, Conn., ¹_{June 15, '95} successfully resected the intestine as low down as the sigmoid flexure for adenocarcinoma of the colon. Six months later the patient began to

have pain over the liver, and died one year after operation, the entire liver being found indurated and covered with nodules.

A case of multiple adenomatous polypi of the large intestine associated with carcinoma, both in the sigmoid flexure and the lower end of the rectum, is recorded by Charles A. Morton, of

Bristol. ⁶
May 18, '95

Artificial Anus and Fæcal Fistula.

During the past few years J. Greig Smith, of Bristol, ¹³¹_{Mar., '96} has had to deal with a number of cases of fæcal fistula left after drainage in cases of obstruction, and also with some cases of artificial anus left after intestinal resection. The method which he has employed, which he has found safe and uniformly successful, aims to perform enterorrhaphy without opening the general peritoneal cavity by detaching from the parietes all around the fistula or anus sufficient peritoneum to permit the delivery of the gut through a parietal incision without separating it from its peritoneal adhesions. The author thinks too much has been made of the agglutination of peritoneal surfaces in abdominal surgery. He considers it by no means certain that two apposed surfaces of intact peritoneum unite as quickly as two surfaces denuded of peritoneum, and states that an opening in the gut can be closed as satisfactorily and as speedily by the apposition of rough cicatricial tissue on its surface as by the apposition of intact peritoneum.

Between the parietal peritoneum and any discharging intestinal opening is a circle of adhesions binding the bowel to the parietes. In the operation to be described these adhesions are left undisturbed. The bowel is delivered through an incision carried above

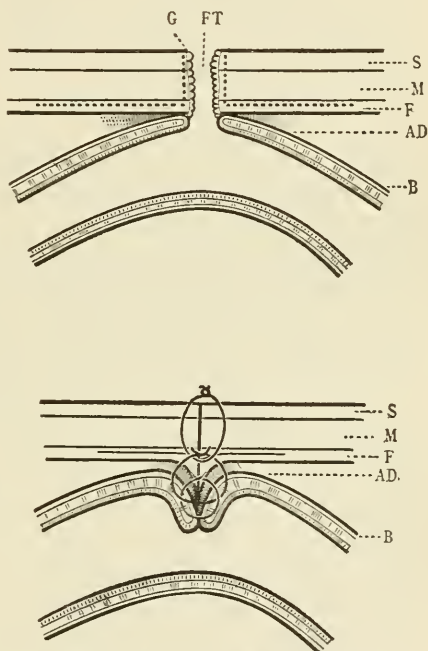


FIG. 1.—METHOD OF CLOSING FÆCAL FISTULA.
(GREIG SMITH.)

FT, fistula in abdominal wall communicating with bowel; G, granulations lining fæcal fistula; S, skin; M, muscular layer; F, subperitoneal fascia; AD, adhesions between bowel and peritoneum surrounding fistula; B, bowel. Broken line in upper diagram shows incisions around fistula and in subperitoneal areolar tissue. Lower diagram shows operation finished and sutures placed.

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and below the parietal opening, along with parietal peritoneum, which is separated from the parietes to any desired extent. The

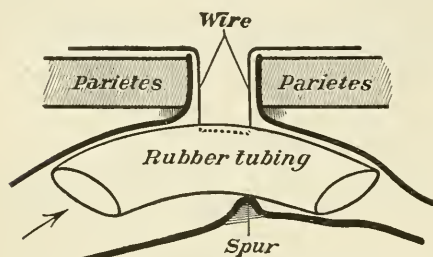


FIG. 2.—BANKS'S METHOD OF REDUCING SPUR AND DILATING CONTRACTED BOWEL IN ARTIFICIAL ANUS. (GREIG SMITH.)

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chief feature in the operation is this separation of parietal peritoneum with its fat all around the fistula for a distance of one or two inches, as is found necessary. The detachment should be begun at a distance from the fistula and carried down to it; it may be done almost entirely with the fingers.

In a case of fæcal fistula the bowel does not protrude

through the parietal opening and there is no spur, or only a slight one. A simple fistula leads from the skin to the bowel. The

first step in the operation is the scraping of the granulations lining the fistula, which is done with a sharp Volkman spoon. If there is any discharge from the intestine, a small sponge with a string attached is pushed through the fistula so as to block it. An incision is then made in the direction of the underlying muscular fibres, with the fistula in the centre. The incision does not pass through the fistula, but is carried around it. The fistula, with the cicatricial tissue surrounding it, is removed bodily. The parietal peritoneum, with its areolar tissue, is separated with the finger for a distance of one or two inches all around. When the separation is complete the fistulous tract is removed down to the gut.

The bowel is now lifted out of the parietal incision by means of forceps and the opening closed by infolding the raw surfaces

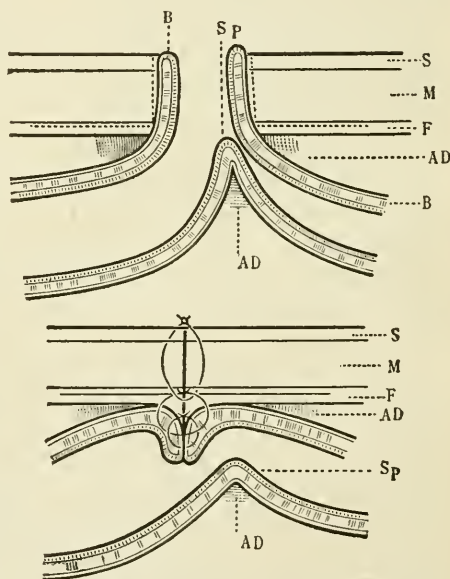


FIG. 3.—METHOD OF CLOSURE OF ARTIFICIAL ANUS. (GREIG SMITH.)

B. bowel; *Sp.* spur; *S.* skin; *M.* muscular layer; *F.* sub-peritoneal fascia; *AD.* adhesions between bowel and peritoneum and between peritoneal surfaces of spur. Broken line in upper diagram shows incisions around gut forming anus and in sub-peritoneal areolar tissue. Lower diagram shows sutures in place and operation finished.

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and uniting with Lembert sutures. This is followed by a continuous (Dupuytren's) suture. The parietal wound is then closed. A small drainage-tube laid over the line of gut sutures adds to the security of the operation by preventing burrowing.

In cases of artificial anus there is almost always a spur present, in which case it is necessary to devote a few days to removing this condition. For this purpose the method adopted by Mitchell Banks is recommended. This consists in introducing a piece of rubber tubing of proper size into the bowel; by being put upon the stretch during its introduction, one of large calibre may be employed; it is anchored by a piece of aluminium wire which passes into, but not through, the wall of the tube. In a few days the spur will have been removed and the lower segment of the bowel will have been dilated, and the tube may then be withdrawn. Two days may be allowed for the irritation caused by the tube to subside before the final step in the operation is performed. The incisions are made as already described for fæcal fistula, and the succeeding steps are also carried out in the same manner. Free detachment of the parietal peritoneum, with accurate suturing of the bowel, is the most important element of success.

N. Senn, of Chicago, ¹¹⁵⁰_{Apr., '95} states that packing the opening with gauze or cotton is a very inefficient way in which to prevent fæcal extravasation in these cases, while the use of clamps and ligatures on each side of the opening in the bowel is equally unreliable. It appears to him that the only safeguard against this source of danger is preliminary closure of the intestinal opening by suturing, placing the sutures so close together as to absolutely prevent the escape of any of the intestinal contents. After this has been done the field of operation is once more thoroughly sterilized before the abdomen is opened and the intestine detached. The sutures should include all of the tunics of the bowel. With few exceptions this row of sutures will remain as Czerny sutures, to be buried after the bowel has been detached by Lembert stitches. He looks upon flexion of the bowel as the most important factor in producing this spur, which may be removed by measures which are calculated to correct this flexion. In artificial anus, produced accidentally or intentionally, the flexion is caused by the prolapse of the intestinal loop into, and sometimes even beyond, the opening in the abdominal wall. If the intestine is detached the flexion is diminished or completely corrected and its recurrence is prevented by transverse suturing of the intestinal opening. A study of his cases has convinced him that the provisional closing of the intestinal opening by transverse suturing before using the knife is the most efficient prophylactic measure against infection, that resection

of the intestine for fistula and artificial anus can be avoided in the majority of cases, and that, in its place, transverse suturing and correction of the flexion will yield better results.

Chaput, of Paris, ³⁶⁰ ⁵⁹ in reporting thirty-five cases treated by him, states that artificial anus can be treated by four different methods: 1. By enterotomy, followed by obliteration of the fistula. (*a*) Enterotomy is indicated when the cases are uncomplicated and the aperture is easily accessible, together with a thin and long partition. When the spur is long and thin it is advisable to adopt Richelot's method; that is, section between two pairs of forceps and immediate suture. If, however, the spur is long and somewhat thickened, it is better to make the suture between two long pairs of forceps, which are allowed to remain in position. Enterotomy is contra-indicated when the spur is very thick or inaccessible or when the aperture is closed by the mechanism of angular wounds. (*b*) After destruction of the spur the stercoral fistula is closed. Small fistulæ are closed by lateral enterorrhaphy, during which operation the margins of the fistula are freely separated from their surroundings and then united with two tiers of sutures, the peritoneum being opened or not, according to the requirements of each individual case. In the case of large fistulæ lateral enterorrhaphy may be employed, but the peritoneum should not be opened. 2. Resection. Resection is, as a general rule, contra-indicated, but, when in the course of a lateral enterorrhaphy the intestine is easily friable and is largely lacerated, it is necessary to resect the two ends and reunite them by appropriate sutures. 3. Longitudinal enterorrhaphy. When enterotomy is for some reason contra-indicated, it is sometimes advisable to employ longitudinal enterorrhaphy without resection. This operation is done by making a circular incision in the skin around the artificial anus and opening the peritoneal cavity. The two ends are drawn out, a longitudinal slit is made in each, and then the margins of the slits of the same side are sewn together with sutures. This operation is indicated when, in the course of a lateral enterorrhaphy, considerable constriction is met with just below the lower end. When the intestine is very friable it is contra-indicated. 4. Entero-anastomosis. Entero-anastomosis, followed by ligature of the two ends between the point of anastomosis and the stercoral aperture, is a simple, easy, and benign operation. It is indicated when the intestine is very friable at the seat of the artificial anus, or when there is a considerable constriction of the bowel in the neighborhood of the external aperture, and also when the inferior end is obliterated at the level of the artificial anus.

Zancarol, of Alexandria, ¹⁴ ⁹⁴ in two cases of iliac anus in

women, following pelvic suppuration, obtained temporary obturation of the intestine by means of a forceps, completely isolating it; then drew it out, sutured it, and returned it into the abdomen. His results were such that he is able to recommend the procedure.

Leonard A. Bidwell, of London, ²_{Apr. 6, '95} suggests, in all cases where a permanent artificial anus is required, the following method, by which a bridge of normal skin separates the openings into the upper and lower portions of the sigmoid, so that there is no chance of any faeces finding their way into the rectum. The incision being made in the ordinary position, the peritoneum is stitched to the skin, a loop of sigmoid is brought out of the wound, and a good-sized hole scratched in its mesosigmoid. A silk-worm-gut suture is passed through the whole thickness of one edge of the wound; it is then carried across the wound through the hole in the mesosigmoid, and is finally passed through the whole thickness of the other edge of the wound. When the suture is tied the two edges of the wound are united within the hole of the mesosigmoid. This stitch should be inserted at the junction of the middle and lower thirds of the incision. No other sutures are necessary; but, as after the gut is divided it is desirable to stitch the four corners of the upper portion to the skin so as to keep the opening free, he usually passes two sutures through the skin on each side of the incision and leaves their ends untied, so as to avoid having to give chloroform when the gut is divided. On the fourth day the bowel is completely divided on a director passed beneath it, and the sutures, previously passed through the skin, are inserted into the upper end of the gut and are tied. The stitches are removed on the eighth or ninth day. He does not give an anæsthetic when completing the operation, since the section of the gut does not appear to be painful; traction on the bowel, on the other hand, usually gives rise to a good deal of pain. The cases on which he has operated after this method have been very satisfactory.

A successful case of operation for stercoral fistula following curetting of a fistulous cicatrix after laparotomy is recorded by Schwartz, of Paris. ³⁵_{July 27, '95} An interesting case of faecal fistula following an operation for double pyosalpinx is reported by J. E. Summers, of Omaha. ⁵⁶³_{Aug., '95}

Hydatid Cysts.

During recent years it has been proved beyond doubt that hydatid disease is largely on the increase in Australasia. This is, according to L. Fitz Patrick, ²⁶⁷_{Dec. 15, '94} mainly owing to the peculiar character of the bush-life of Australia, where the traveler and settler is exposed daily to the danger of contagion. A large

percentage of the cases treated in the metropolitan hospitals come from the far interior of the country, where the farmer, selector, squatter, and drover are alike obliged to drink the exposed waters of dams and tanks at which the dogs and cattle also drink and bathe, and it is mostly from these animals that the ova pass, to lie quiescent until received into the human body.

The author cites a number of cases showing that no part of the human body is exempt, the heart, the brain, the bones, and the eyes being occasionally selected, but by far the larger number favoring the abdominal organs, especially the liver, which the traveling parasite doubtless reaches through the portal system.

In reporting two cases of multiple hydatids of the abdomen Charles S. Ryan, of Melbourne, ²⁸⁵_{Aug. 20, '95} calls attention to the operative treatment of abdominal hydatids in general, believing that want of success in the past has been due largely to an attempt to do too much at a single operation, instead of attacking different regions by separate operations. In one of the cases the first operation revealed, besides the abdominal cyst evacuated, a pelvic cyst pressing upon the rectum. He operated on this cyst from above, but experienced trouble and delay in healing on account of the up-hill drainage; and he states that in another similar case he would now operate through the rectum, remove the mother-cyst, and stitch up the opening in the rectum. He believes that the full recognition of the pathological significance of the fibrous adventitia and its management on the principles laid down by Hamilton Russell ¹¹⁸⁷_{Feb., '95} will revolutionize the operative treatment of hydatid disease and mark a most important epoch in the treatment of this affection. In both instances in his second case, after removal of the lower cyst through the diaphragm and after the removal of the splenic cyst, the fibrous sac was allowed to drop back unclosed after removal of the cyst and its contents according to Russell's method. Recovery was absolutely unmarred and was completed in a few days, being exactly similar to the recovery which follows any simple abdominal incision in which union by the first intention throughout takes place.

C. J. Bond, of Leicester, ⁶_{Feb. 16, '95} treats all cysts which are not suppurating by incision, evacuation of the contents, and closure of the abdominal wound without drainage. By simply removing the daughter-cysts and the parasitic endocyst, which has no organic connection with the adventitious cyst, and by not making any attempt to remove or separate from surrounding parts the latter fibrous investment, the danger of hæmorrhage is entirely avoided.

W. Moore, of Melbourne, ²⁸⁵_{Sept. 20, '94} reported three cases of abdominal hydatids treated by Bond's method, in which the incision

in the cyst is made directly under or opposite to the abdominal incision, as described by Bond himself.²
Jan. 26, '95 The two incisions, even when the cyst is empty, lie against each other; if the cyst become distended they press firmly against each other; so that if any leakage should take place it would simply result in the formation of adhesions between the sac and the abdominal wall at the site of the incisions. Nothing more would then be necessary than to insert a sinus-forceps through the centre of the abdominal incision.

G. Magnusson, of Reykjavik, Iceland,³⁷³
No. 9, '95 strongly recommends Volkmann's operation, which he has employed in seven cases, the period between the laparotomy and the puncture of the bladder being one week; in one case the whole procedure was performed without any general anæsthetic, cocaine only being used. (Report of Holger Mygind, corresponding editor, Copenhagen.)

R. B. Duncan, of Kyneton, Australia,⁶
Feb. 9, '95 points out that ventral hernia is very apt to follow Lindemann's method, and that, although in the series of cases reported he had employed it, cysts of moderate dimensions could be treated by complete evacuation and immediate closure, as recommended by Bond, while partial or complete excision could be practiced in cysts that were free in the abdominal cavity. C. S. Ryan,⁶
Feb. 9, '95 quoted a remarkable case in which he had operated six times. He had employed Bond's method, modified by not stitching the adventitia, treating 32 cysts,—5 in the liver and the rest in the omentum and abdominal cavity. Several of the latter were excised entire. The patient had recovered, but still had 2 cysts remaining,—1 on the convex surface of the liver and 1 in the spleen.

In a case described by J. H. Morgan, of London,⁶
Feb. 9, '95 this surgeon was able to completely evacuate the cyst and enucleate the sac. With proper precautions and good assistance the only danger to be apprehended is from hæmorrhage, and this can, to a large extent, be discounted by modern methods and the exercise of great care and patience. In the present instance it was never formidable and was soon arrested. No drainage-tube was used. The proximity and intimate connection of the gall-bladder to the wall of the cyst showed itself in the midst of the operation, the gall-bladder appearing as a prolongation of the tumor. Serious complications would have ensued had it not been recognized. No harm seems to have followed the manipulation which was necessary to separate the adhesions between the two surfaces.

Frank showed to the Vienna Medical Society⁶
Apr. 27, '95 an hydatid cyst remarkable by reason of its position. The patient, a woman 26 years of age, suffered from a tense, fluctuating tumor which

could be felt above the symphysis pubis, and was supposed to be ovarian. The cyst was removed by laparotomy and was found to be of an ovoid form, measuring in its long diameter seventeen centimetres and in its transverse diameter thirteen centimetres. It contained a turbid, yellow fluid, the sediment of which consisted of scolices in a state of fatty degeneration, whereas the wall of the cyst was covered with numerous sterile, secondary vesicles.

Lejars¹⁴_{July 21, '95} removed three hydatid cysts from the abdominal cavity of a young woman,—one from under the abdominal wall, another from the anterior *cul-de-sac* of the vagina, and the other from the region of the left hypochondrium. The growths were hard, irregular, without fluctuation, but freely movable, the latter fact enabling them to be diagnosed. They were contained in the transverse and descending colon and were easily removed.

A rare case of retroperitoneal cyst is described by Schönwerth.³⁴_{No. 2, '95} The patient, a woman of 30 years, after a fall upon the abdomen, observed a gradual swelling on the left side, which caused a suspicion of renal cyst. Exploratory laparotomy revealed a retroperitoneal cyst. When she had recovered from the operation, a lumbar incision showed that the kidney was healthy. In addition to the vertical incision, an horizontal one was made, which showed a cyst containing a cloudy, yellow, thick fluid, which contained fat-cells and cholesterin-crystals. The cyst was situated in the substance of the psoas muscle and was surrounded by a strong, thick membrane. The author believes that the case was one of an unusual class,—that of cystic transformation of a muscular hæmatoma.

Reginald Harrison²_{Apr. 13, '95} successfully treated a large pelvic hydatid by means of incision and drainage. An exhaustive review of hydatid cysts of the peritoneum is published by Maurice Soupault, of Paris.¹⁰⁰_{July 7, '95} Bond²_{Jan. 20, '95} adds another case of his own successfully treated by this method. A. J. Banker and A. P. Roope, of Columbus, Ind.,⁵⁶_{Nov., '94} report a case in which a long, lax pedicle, the great extent of its attachment, its shape and size caused the tumor to greatly resemble a floating kidney. The growth proved to be an echinococcous cyst and was evacuated, and the case terminated successfully.

Rudall, of Melbourne,²⁸⁵_{Jan. 20, '95} is of opinion that success is rarely, if ever, to be expected from simple tapping when the cysts are suppurating or contain daughter-cysts. In such cases two methods are chiefly in use: (1) free incision of the cyst with evacuation of its contents and removal of the cyst itself, if it can be got away, as it generally can be, and (2) tapping with a large trocar and cannula, leaving the latter in the cyst for many hours or some days. In the

operative treatment of hydatids, however, the success is in direct ratio with the thoroughness of evacuation by the shortest route to the surface of the body.

Galliard, of Paris, ¹⁴_{Jan. 27, '96} relates a case showing that the irruption of bile into hydatid cysts does not always cause their death. In this case, Girode, who made an exploratory puncture with a Pravaz syringe, withdrawing only about 1 gramme of fluid, was surprised to find next day that the tumor had decreased in size in a manner altogether out of proportion to the quantity of fluid withdrawn.

Walther ³_{Oct. 26, '95} calls attention to the gastric disturbance and rise of temperature sometimes observed the day after operation for hydatid cysts, and persisting for five, six, or, at the most, ten days. This condition is evidently due to intestinal infection, and is explained by Walther as follows:—

At the moment the cyst is punctured there is a sudden relaxation of compression in the liver; this gives rise to great congestion of that organ, interfering with the function of the hepatic cells; and when, as Hanot has shown, this function is interfered with, rapid infection of the liver occurs, having its point of departure in the intestinal tract.

J. P. Ryan, of Melbourne, ²⁸⁵_{Nov. 20, '94} describes the case of a patient attacked with jaundice and presenting marked enlargement of the liver. After free purging a number of hydatid cysts were passed in the stools and the jaundice and other symptoms disappeared. Five months afterward he again became ill with jaundice, emaciation, and fever. The abdomen was opened and the liver examined with the hand, but no cyst discovered. The liver was freely explored with a long trocar, but neither hydatid fluid nor pus was withdrawn. The patient gradually developed chronic septicæmia and died six weeks after the operation. At the necropsy the liver was found riddled with small abscesses, but no hydatids were found in any of the organs.

In a case operated on by Treves, of London, ²²_{Nov. 14, '94} it was necessary to make two openings, there being two cysts.

Bond's operation is recommended by G. A. Syme, of Melbourne, ²⁸⁵_{Apr. 20, '95} who reports a successful case which he considers a good test-case for the operation, as it showed that, while bile might escape, it could make its way to the surface without doing serious harm, the patient being afterward in a much better condition than if Lindemann's operation had been performed.

Cases are recorded by W. J. Collins, of London, ⁶_{Aug. 17, '95} and Puppe, of Berlin, ⁴_{No. 20, '95} in which operation was successful, and one by T. E. Green, of Melbourne, ²⁸⁵_{Sept. 20, '95} treated by intra-peritoneal

operation without suture of sac, in which peritonitis supervened with fatal results.

Peritonitis.

Howard Marsh ⁶_{Oct. 27, '94} publishes a case of peritonitis due to enteritis—a rare cause—in which recovery was apparently aided by the emptying of the small intestine, with the object of preventing further infection of the peritoneum. Marsh states that, as the cavity of the intestine, in cases of this kind, swarms with virulent micro-organisms, which are constantly making their way through the bowel-wall and reaching the peritoneum, it becomes apparent that it is not enough merely to perform laparotomy and wash out the peritoneal cavity. In addition to this it is often necessary to open the intestine and, as far as possible, to remove the material which it contains and which teems with a virulent micro-organism by which the process of peritoneal inoculation is being constantly repeated. The result, in the instance under notice, of this principle of treatment was very striking. Vomiting immediately ceased and flatus was passed; distension subsided; the next day a free action of the bowels spontaneously occurred, and the previously extremely grave condition of the patient was forthwith exchanged for one which was marked by no serious symptom of any kind. The case, together with others which have recently been published, shows that the belief that operative interference in acute general peritonitis is of little avail is happily erroneous. It appears safe to anticipate that, in the future, numerous cases will be saved which, in the past, would inevitably have ended fatally. The severe diarrhœa which set in more than a week after the operation may be regarded as eliminative. A very important point in operating on such a case as the present—beyond the sparing use of the anæsthetic employed—is that the proceeding should occupy as limited a time as is consistent with the careful performance of its various stages. In this instance the operation was completed in twenty-five minutes.

In grave cases of general peritonitis, in which great distension may cause fatal paralysis of the intestine, Mixer, of Boston, ⁹⁹_{Feb. 28, '95} believes it is safe to open the coils of intestine at as many points as may be necessary to thoroughly drain them. He recommends that they be drawn out of the wound, held over a basin, incised in from one to four places, and thoroughly emptied, after which they should be quickly washed off with hot saline solution, sewed up and returned, and the abdominal incision closed. The author has used this method in nearly twenty cases, some of which recovered, and in those that died the wounds were found to be tight. Mixer

feels certain that, by means of this operation, we may save certain patients that otherwise would surely die. In cases that have had an abdominal incision on the right side the author secures permanent drainage by introducing a tube into the most prominent part of the cæcum and retaining it as long as necessary. Through this tube salts and stimulants may be introduced if the stomach will not retain food.

Mirabella⁵⁸⁹_{July 1, '95} reports two cases of acute suppurative peritonitis in children of $2\frac{1}{4}$ and 3 years, respectively, in which he performed laparotomy with very successful results. In neither case could any known cause for the peritonitis be found. The usual medicinal means—opium, ice, leeches, etc.—were first tried and proved of no avail.

Herrhold⁶⁹_{Sept. 27, '94} relates two cases of diffuse purulent peritonitis successfully treated by incision and drainage, and gives statistics of published cases similarly treated. In the Berlin Charité 25 such cases have occurred, and of these but 5 recovered, owing to the hopeless nature of the cases; in 2 the peritonitis was due to perforation in enteric fever, in 9 to long-continued obstruction, in 4 to perforating intestinal ulcers, in 1 to a perforating gastric ulcer, and in 9 no cause was known. Purulent peritonitis, which is part of a general sepsis, is hopeless.

Helferich³¹_{Apr. 16, '95} agrees with Sahli as to the usually purulent character of the exudate, and, while admitting that this may be entirely absorbed, does not think that the surgeon should rely upon it. He does not agree with him as to the advisability of waiting six or eight days, since it is clearly proved by Fitz's statistics that 56 per cent. of the fatal cases occur within the first week. Diffuse peritonitis occurs in two forms,—one, the diffused septic variety, with symptoms of septic intoxication soon supervening and rendering the case quite hopeless; and the other a progressive fibrino-purulent form, the prognosis of which is somewhat better. In all such cases operation should be performed immediately, unless the patient is so profoundly collapsed as to render it unjustifiable. Relapses frequently demand interference, especially if the patient is not quite well between the attacks.

Schuchardt, of Stettin,²⁰⁶¹_{Apr. 17, '95} states that hitherto success has not crowned efforts at surgical intervention in peritonitis due to perforation of a gastric ulcer. Heusner, he believes, is the only surgeon who has succeeded in saving a case, operated on sixteen hours after the appearance of symptoms of peritonitis. In a case of his own the patient was a young girl with suppurative fibrinous peritonitis localized above the umbilicus and due to a round ulcer that had not been diagnosed. He did not excise this ulcer,

but merely closed the perforation by serous sutures, the patient recovering. In a second case operation, unsuccessfully attempted three weeks after perforation, showed that the suppurative peritonitis had remained localized above the umbilicus. In the discussion of this paper Heusner, of Barmen, stated that he had since operated on three other cases, all fatal. One of them promised to be successful, but hæmorrhage from a second ulcer of the stomach caused the death of the patient.

Tubercular Peritonitis.

R. T. Morris, of New York, ⁹_{Oct. 13, '95} has been experimenting with a view to determine the reason for the cure of tuberculosis of the peritoneum after operation, it being a well-known fact that more than 80 per cent. of these cases recover as a result of simply exposing the peritoneal cavity to the air. His experiments show that recovery after operation occurs because putrefactive bacteria produce a toxalbumin in the fluid which is fatal to tubercle bacilli in the peritoneum. The reason why it is more effective in curing cases of tuberculosis of the peritoneum than tuberculosis of the knee-joint is because the anatomy of the peritoneum is such that any toxic agent absorbed by the lymphatics of the peritoneum is brought into close contact with the entire structure, whereas in the knee-joint the lymphatics are fewer and with more definite channels.

According to the experiments of Stchégoleff, ⁴⁵⁷_{Sept. 1, '94} if laparotomy be performed late in the disease, a cure can no longer be secured, though life may often be prolonged. The curative action of a laparotomy, he believes, is due to a combination of physical causes, as traumatism of the peritoneum during operation, thermic influence, penetration of air into the abdominal cavity, and perhaps the action of light, causing an irritation of the peritoneum, followed by an inflammatory deposit. The inflammatory reaction is characterized by an infiltration of embryonic cells, phagocytosis, and an active development of the endothelial cells. This new tissue organizes and the specific elements of tuberculosis perish or are absorbed. That evacuation of liquid is not necessarily the cause of the cure is shown by those cases which get well after laparotomy in which no liquid was found at the time of the operation. The author thinks that dogs are more susceptible to tuberculosis than is usually thought.

In cases in which laparotomy is successful Nannotti and Baciocchi, ⁵⁰⁵_{No. 57, '95} believe that it should be repeated if necessary. The involution of tuberculous nodules after laparotomy is, as a rule, rapid, but there generally remain some foci which disappear

much more slowly; so that one ought to be cautious in speaking of absolute cure. The operation sets up an inflammatory reaction of the peritoneum, accompanied by a noteworthy increase in its absorbing power, phagocytosis, degeneration of the cellular elements, connective-tissue formation, and vascularization of the tuberculous nodules, with successive fibrous transformation. The authors recommend comparatively early operation in man, not only for its immediate good effect, but to prevent any further spreading.

The effusive form is usually looked upon as more favorable for operation than the adhesive, or obliterating, form. Frees, of Giessen,⁶⁹ Nos. 45, 46, 94 gives short details of 18 cases of tuberculous peritonitis with effusion treated by abdominal section. Nodules were found in all the cases on the visceral and parietal peritoneum. Twice the peritonitis appeared to start from the Fallopian tubes, but these were not removed, as the process was so very generalized; one of these, operated on in 1889, is still living. In 3 others the clinical course, etc., made the same origin probable. Of the 18 cases 6 were completely cured. The longest period since the laparotomy is five years and one-fourth. In this case a second laparotomy had to be done nine months later. In another case the wound burst open and closed again after two months.

Jordan⁷⁶¹ B. 13, p. 760, '95 reports a very unusual case in which there was a tuberculosis sicca of a large, irreducible, inguinal hernia, which disappeared after an exploratory incision, rendering the hernia reducible, as was ascertained by an examination one year later. The patient's health had improved, but a small fistula had formed in the wound, which discharged thin pus, and all that was left of the thick masses found at the time of operation were some nodules.

Mazzoni² Nov. 16, '95 has had the opportunity of performing laparotomy in thirty-five cases of tuberculous peritonitis, with thirty-three cures. In two cases he had repeated the operation eight and sixteen months afterward. He was content, as a rule, with opening the abdomen and drying the liquid without producing traumatism, which he considered superfluous and sometimes dangerous. Anatomically and microscopically the form was that of diffuse tuberculosis with very numerous typical tubercles.

L. H. Dunning, of Indianapolis,⁵⁶ July, '95 points out the frequency of an elevated temperature as a diagnostic symptom, though in some latent and chronic cases there is a persistent subnormal temperature.

Good reviews of the subject of tubercular peritonitis are given by J. G. Sherrill, of Louisville,⁷¹ May 15, '95 and R. A. Wheaton, of St. Paul.¹⁰⁵ Aug. 15, '95

MESENTERY.

Embolus of Artery.

The diagnosis of obstruction of the superior mesenteric artery has but recently received attention, while a single case, that of J. W. Elliot,⁹⁰_{Dec. 6, '94} has been relieved by operation.

Pilliet's theory, that a bacterial inflammation in the intestine may start a thrombus in the veins, appears to Elliot,⁹⁶_{Jan., '95} to be the most encouraging suggestion that he has met with.

As occlusion of the mesenteric vessels is usually associated with heart disease or atheromatous arteries or cirrhosis of the liver, much cannot be expected from operative treatment. Nevertheless, patients with symptoms of intestinal obstruction cannot be left unrelieved, and, if the lesions prove to be purely local, this condition may offer a chance for an occasional surgical success.

Watson, of Boston,⁹⁹_{Dec. 6, '94} in reporting a case, says that the following symptoms, when associated, are fairly, though not quite positively, characteristic: "1. Colicky, very intense, not definitely localized abdominal pain. 2. Bloody diarrhœa. 3. Subnormal temperature. Vomiting, if present (and next to pain it is the most frequent symptom), strengthens the diagnosis, as do also abdominal distension and marked prostration; but the first two or first three symptoms, when occurring in combination, are the only ones that can be called in any sense characteristic. Pain is the first symptom more often than any other, and its intense character is dwelt on by several authors. In regard to operation, it may be concluded that laparotomy is indicated in all cases in which the symptoms suggest the nature of the disease and in which the patient is not too greatly prostrated or has not some other fatal disease. There will probably occur a few in which the local and general condition is very favorable to success. Resection with immediate suture is recommended where possible."

In the discussion of Watson's paper, H. O. Marcy described a case in which, at the autopsy, an embolism of the mesenteric artery was clearly defined and about two feet of the small intestine were necrotic. The line of demarkation was not very clear. The interesting thing was the extremely atheromatous condition of the descending aorta, showing that there was abundant reason for finding such condition. The author quoted Frank S. Billings, who had stated that it was not at all uncommon to find embolism of the mesenteric artery and gangrene of the intestine in horses, even in young animals in an otherwise healthy condition. H. O. Lothrop also reported a case of embolus of the mesenteric artery witnessed by him.

Tumors of the Abdomen.

Regarding the length of small intestine that can with safety be resected, Trzebický³_{Oct.27,'94} thinks he is warranted in stating that, in man, to remove the half of the jejuno-ileum (about 8 feet) may be considered as "admissible intervention." Certain authors maintain that when too large a portion of the intestine is resected the patient finally succumbs to marasmus, digestive troubles, and insufficient nutrition. Others, however, like Kœberlé, Baum, Kocher, Hahn, and Schlange, have been able to remove nearly 2 metres of intestine and the patients have definitely recovered. The same result was obtained in a case reported by Hinterstoisser,⁸_{Feb.7,'95} in which, during a laparotomy for strangulated umbilical hernia in a woman 36 years old, 186 centimetres of the small intestine were removed and the operation terminated by a circular enterorrhaphy. The third day after the operation, a state of collapse, with peritoneal symptoms, set in, which was dissipated after two days, following a copious intestinal evacuation. The patient remained in the hospital forty-two days, and during that time had not presented any digestive troubles. Notwithstanding the fact that she lost 5 kilogrammes (11 pounds) in weight, having weighed 91 kilogrammes (200 pounds) on entering the hospital, she remained vigorous and in good health.

Elliot⁹⁹_{July 4,'95} reported a case from which he had resected 4 feet of intestine for mesenteric thrombosis one year previously. Health had completely returned. Rugg⁵⁸⁹_{p.1558,'94} resected 6½ feet of intestine from a child aged 8 years for intestinal stenosis following grave traumatism, and obtained a complete recovery.

Ullmann¹⁴_{Dec.5,'94} presented to the Vienna Medical Society two women from whom he had removed large portions of intestine for cancer. In one case he resected 63 centimetres and in the other 1.60 metres. The results of the operation were favorable. In both cases he practiced union by first intention,—in one with the aid of Murphy's button, in the other by a process borrowed from Australian surgeons.

In a case of fibroma seen by Réclus, of Paris,¹⁴_{Oct.24,'94} in which the neoplasm was adherent to the intestine, the operator practiced a partial ablation. The remaining neoplasm generally decreased in size until it had reached the size of an egg at the time the case was reported.

When an abdominal tumor, even though benign, has formed adhesions with the intestine, it is impossible to remove the tumor without resecting the intestine. In order to avoid all the forms of complications which accompany the resection, Jaboulay²¹¹_{No.45,'94} proposes to withdraw from the abdomen and to expose the tumors

grafted upon the intestines, isolating them from the peritoneal cavity, which allows of their more or less tardy excision without danger to the surrounding parts.

Lundin and Heabom, of Upsala, ³⁷²_{v. 30, No. 2} successfully removed from the abdominal cavity a lipoma weighing 34 pounds.

Abdominal Wall.—Lathuraz, of Lyons, ²¹¹_{Nov. 18, '94} states that Pollosson removed a fibroma of the abdominal wall from a woman aged 36. For three years it remained no larger than a walnut, but for twelve months before operation it grew rapidly till at length it became so large that the woman seemed as though pregnant at term. Some of the peritoneum had to be resected and the gap was closed with sutures. The patient died on the second day after symptoms of peritonitis. The author states that the disease is much more common in woman than in man. Claude, of Paris, describes a similar case, ¹⁴_{Feb. 27, '95} in which operation was successful, and Fieux, of Bordeaux, ¹⁸⁸_{July 21, '95} another.

Peritoneum.—A fibrosarcoma of the peritoneum was removed by J. A. Hutton, of Scarborough, ²_{Feb. 9, '95} an incision three inches long being made over the growth, dividing the skin, subcutaneous tissue, and external oblique muscle. On cutting through the internal oblique the growth was cut into, and was found to be solid, infiltrating the deeper part of that muscle, and apparently inclosed in an indefinite capsule. The peritoneum was opened above the growth and a large flat sponge inserted. An omental adhesion was divided. The growth, with peritoneum and muscles, was snipped round with scissors and removed. The peritoneum and muscles were brought together by interrupted silk sutures, and a double cyanide and blue wool dressing applied. The patient recovered without a bad symptom. On microscopical examination the growth proved to be a fibrosarcoma.

C. Studsgaard, of Copenhagen, ³⁷³_{p. 641, '94} finds, from a study of the literature, that ninety cases of tumors of the mesentery have so far been recorded. These consisted of lipomata, malignant tumors, lymphangioma, and cysts. The cysts were serous, bloody (apparently springing from the lymphatic glands), hydatid, or chylous. He adds a case of his own,—that of a large cyst successfully removed from a 14-year-old girl. It appeared to have originated either in the small intestine or the vermiform appendix.

F. Cauthorn, of Portland, Ore., ³²⁰_{July, '95} reports the case of a man, 49 years of age, from whom forty-three inches of intestine were removed on account of a sarcomatous growth involving the mesentery. End-to-end anastomosis with the Murphy button was practiced and the man made a good recovery. Four months later he had an attack of intestinal obstruction and died, and at the autopsy

the button, which had never been passed, was found arrested some distance below the anastomosis by an intestinal adhesion. This was the cause of the obstruction.

Routier, of Paris, ¹⁴_{Feb. 17, '95}; ²²_{Feb. 27} relates the case of a woman who consulted him for an abdominal tumor which had developed very rapidly. On examination a large mass was found in the abdomen leaning a little to the right side, hard to the touch, and apparently connected with the ovary. Laparotomy was performed, but, instead of a cyst of the ovary as was expected, a non-pediculated tumor enveloped in a net-work of vascular tissue was brought to view. It was removed with difficulty and the patient made a good recovery. The histological examination of the mass proved it to be sarcomatous.

Lathuraz presented to the Lyons Medical Society ²¹¹_{July 7, '95} a tumor of the mesentery removed by Laroyeune from a woman, 42 years of age, whose abdomen, on entering hospital, measured nearly two metres in circumference beneath the umbilicus. She suffered from marked dyspnoea of mechanical origin and could not lie down nor even recline, while walking was rendered painful by the size of the tumor and œdema of the limbs. Examination showed a generalized dullness on percussion of the abdomen, except in the epigastric region, where resonance was obtained. The dullness was not modified by a lateral position. Operation was performed, the patient bearing well the great traumatism incident to the removal of a tumor weighing forty pounds. The temperature in the evening was 38.4° C. (101.2° F.) and the pulse was fairly strong. The case is interesting from the fact that it forms an exception to the rule of tumors of the mesentery, one of the classical symptoms of which is resonance on percussion, and presented dullness,—a point already indicated by Augagneur.

W. H. Wenning ⁵³_{Dec. 22, '94} describes a case of chyle-cysts of the mesentery in a woman of healthy appearance. The growth was supposed to be ovarian. On opening the abdomen a large coil of intestine sprang out, which was held aside with hot cloths. Beneath was found a large cyst, translucent and filled with a white substance. The covering was so thin as to resemble a veil spread over some white globular body. Upon the slightest puncture the cyst ruptured. The entire mesentery was filled with these apparently globular bodies, varying in size from a foetal head to an orange and in number amounting to at least fifty. At first appearance they resembled so many hard-boiled eggs minus their shells, and were covered with a thin, pinkish membrane imbedded between the layers of the mesentery. It was found impossible to remove them; so the abdominal cavity was washed out, ligatures applied

to the bleeding vessels, and the incisions closed. The patient died shortly afterward from shock, and at the post-mortem examination the mesenteric veins and glands were found diseased; the veins were varicose and exceedingly soft, many of them ranging from one-third to one inch in diameter.

Tachard ³_{Aug. 7, '95} states that laparotomy and extirpation are regarded at present as the sole means of treating a cystic tumor of the abdomen. He has, however, succeeded in curing by simple capillary aspiration a case in which the neoplasm was situated below the umbilicus in a soldier of 22 years. Several months later the tumor had not re-appeared.

Brentano ⁴_{No. 18, '95} contributes three cases and R. Ullman ¹¹³_{Sept. 8, '94} one case cured by laparotomy. A case is reported by Reynier ¹⁰⁰_{Jan. 1, '95} in which laparotomy had been performed for acute intestinal obstruction, the nature of the growth being revealed at the autopsy.

Hoehenegg ⁵⁷_{Nov. 6, 7, '95} advocates simple aspiration at first, and, should this fail, laparotomy with fixation of the sac to the peritoneum. The diagnosis and treatment of cysts of the mesentery are discussed by Adam, of Nancy. ¹⁴_{June 9, '95}

Ileo-Cæcal Region.—Körte ³⁰¹_{B. 40, H. 5, 6, '95} states that the ileo-cæcal region is a point of predilection for the development of malignant tumors, mostly in the form of carcinoma and local intestinal tuberculosis. The lumen of the gut is diminished and the glands much enlarged. He has had 13 cases, 7 of which were operated on successfully; 2 of these, however, ended fatally eight and eleven months later, respectively. Three of the cases operated on were carcinoma, 3 tuberculosis, and 1 actinomycosis of the cæcum.

The onset of malignant disease is very insidious, the symptoms being usually those of typhilitis and coprostasis. As regards treatment, resection and reunion of the divided parts are necessary, symptoms of acute obstructions being contra-indications. Simple enterostomy is here called for, with resection later on. The extent of the tumor and advanced cachexia are also contra-indications. Of the 3 tuberculous cases 2 were hereditarily predisposed.

A fibrosarcoma of the ileo-cæcal valve was removed by Lavisé ¹¹⁹³_{Oct., '94} from a woman 56 years of age. It had caused obstruction of the lower end of the ileum and of the cæcum.

Cæcum.—A. H. Pilliet and P. Thierry, of Paris, ⁷³_{Nov. 24, '94} describe the case of a woman, aged 55, who for twelve months had been aware of a painful swelling in the right groin. She was obliged to go to stool soon after every meal, and had frequently noticed blood in the motions. On examination a lump as large as a closed fist was felt in the right iliac fossa. It was hard and seemed to be incorporated with the abdominal wall. It was sharply defined and

appeared as if attached at its lower end to Poupart's ligament. After an operation the state of hectic fever continued unabated; there was much coughing and once a rather severe hæmorrhage from the wound, and the patient died in fifteen days. After death both lungs were found to be studded with tubercles. From the cæcum tubercular peritonitis could be traced as high as the right hypochondrium and along the ascending and the transverse colons. The external iliac glands had suppurated and the abscess had burrowed along the iliac and femoral vessels.

G. Coquet²¹²_{Apr. 10, '95} has studied the subject of tuberculous typhlitis, particularly the form simulating a tumor of the cæcal region, and finds that it is characterized at the onset by abdominal pain, frequently diffuse, originating in the right iliac fossa and radiating in various directions. This is followed by alternating constipation and diarrhœa, bloody stools, emaciation, etc. The local signs are manifest on palpation, which is often so painful as to require chloroform. Fever is rarely absent, appearing in attacks which reach a maximum in the evening. Loss of strength, digestive disturbances, leading to diarrhœa and anorexia, more or less rapidly bring on a period of cachexia.

In a case of tuberculous degeneration of the cæcum complicated by an external fistula Obalinski, of Cracow,³³⁶_{No. 49, '94} found it impossible to bring together the divided ends of the ascending colon and the ileum. He therefore divided the colon at the junction of the ascending and transverse portions, closed by sutures the open ends of the ascending colon, thus shutting off this portion of intestine from the rest of the intestinal tract, and, finally, stitched together the open ends of the transverse colon and the ileum. This operation, which occupied three hours, was followed by complete recovery. The patient, a female aged 24, was discharged at the end of the second month. The stools were normal and regular and no trouble had been caused by the presence in the abdomen of a completely-closed and isolated portion of intestine. Obalinski claims that such a procedure is much better than simple short-circuiting of the growth by lateral implantation or by lateral anastomosis, since in all these there is considerable risk of regurgitation of fæcal material into the blind end or short-circuited loop of bowel, giving rise to stagnation within it, and, possibly, dangerous symptoms.

Adam, of Nancy,¹⁶⁴_{June 5, '95} does not depend on the functional symptoms in diagnosing cancer of the cæcum, but upon most careful palpation of the abdomen, which enables him to detect the tumor at an early period. Upon early diagnosis depends the success of the treatment.

Magill ⁹⁶_{June, '95} is of the opinion that excision of the cæcum should be attempted in every case of primary neoplasm, unless forbidden by extensive infiltration. Tuberculosis or inflammation localized at the ileo-cæcal coil demands its resection if the patient can bear operation and if more than temporary benefit will accrue. Operated appendicitis with unsatisfactory results is amenable to resection, and primary resection is safer and better than excision for fistula. Invagination in the region of the cæcum is frequently complicated by cancer, and the excision must be extensive. Fistula of the ileo-cæcal coil can safely be treated by resection if no extensive suppuration has invaded or entered the iliac fossa. An irreducible cæcum may be excised with safety. Except in acute obstruction the continuity of the digestive tract must be at once established and secured against leakage. For this sutures are bad, the better plan being anastomosis by absorbable plates or lateral implantation with the anastomotic button.

Entero-anastomosis by implantation was successfully employed by Jaboulay, of Lyons, in a case of cancer of the cæcum. Sargnon, who reports the case, ²¹¹_{Aug. 4, '95} remarks on the gravity of the operation, the statistics of Artus ²⁰⁰⁰_{'94} showing a mortality of 48 per cent. in thirty-three cases, due either to peritonitis, either post-operative or from loosening of the sutures, or to surgical shock caused by the long duration of the operation. In view of the present perfection in technique of anastomosis, Jaboulay advises entero-anastomosis without resection, and the slow evolution of these tumors, the rarity of definite cure after resection, and the extreme gravity of extirpation are also arguments in favor of anastomosis. Jaboulay also prefers such benign measures in cancer of other parts of the intestine, owing to the slow development of these growths, as demonstrated by Rubenthaler. ²⁰⁴⁵_{July, '95} He prefers Murphy's or Villard's button to enterorrhaphy, as involving less danger of peritonitis by perforation and greatly diminishing the length of the operation. In complicated cases in which obstruction occurs Artus ²⁰⁰⁰_{'94} recommends resection of the intestinal loop without any attempt at reduction and the establishment of an artificial anus in cases of occlusion.

Penetrating Wounds of the Abdomen.

Diagnosis.—In a case of gunshot wound of the abdomen perforating the liver, reported by H. M. Taylor and Landon B. Edwards, of Richmond, ⁸¹_{Aug., '95} the absence of shock when the patient was first seen, an hour after being wounded, was very striking. The pulse was about 85 or 90, the temperature normal; the facial expression good, the lips red. This condition, as subsequent reve-

lations demonstrated, emphasizes the fact that shock is of no diagnostic value in differentiating between a penetrating and non-penetrating wound of the abdomen. It confirms the conclusion that a penetrating wound of the abdomen, with serious visceral lesions, may be accompanied with little or no shock; while, on the other hand, it is recognized that a very insignificant wound, penetrating or non-penetrating, of the abdominal wall, may be attended by profound shock. Their patient walked about half a mile, and most of the distance over rough fields and uphill, after being shot, when he got into a carriage, rode sitting up to his home, a mile off, walked upstairs practically unassisted, and yet showed no sign of shock. In bullet as well as other injuries the maximum degree of shock, if any, is reached early,—immediately after the injury,—while the depression incident to hæmorrhage is slower in its advent and is progressive.

A case seen by Sonnenburg, of Berlin, ¹¹⁵³_{Feb. 6, '06} also shows that extensive injuries may give rise to no active symptoms at first. In fact, on account of the absence of symptoms the treatment was at first expectant, but three hours later vomiting came on, the pulse became smaller and more frequent, and immediate laparotomy became necessary. On opening the abdomen a large quantity of blood mixed with fæces was found, and signs of commencing peritonitis on all the coils of intestines. The injuries were numerous: there was an opening through the omentum which involved a large artery and two openings in the transverse colon, without extrusion of mucous membrane; these were carefully closed. An opening in the small intestine, with free hæmorrhage, and two openings in the higher intestinal coils were sutured. There were altogether four openings into the intestine and two injuries of the mesentery and the omentum. Careful observation had positively shown that, if operation had been delayed, peritonitis would soon have set in.

W. L. Robinson, of Danville, Va., ⁶¹_{Dec. 16, '94} reported two cases in which there was marked laceration of the liver and bowel. In neither case were the symptoms commensurate with the injury; neither shock, hæmorrhage, nor high pulse portrayed the necessity for operation. Notwithstanding operative interference the first patient died in three days and the second in two, from shock.

Schwartz, of Paris, ³⁵_{Feb. 16, '05} cites the case of a young man who, after a wound of the abdomen by a revolver, showed no trace of the course taken by the projectile, and for forty-eight hours no inflammatory phenomena, but who suddenly succumbed within a few hours to peritoneal septicæmia. Autopsy showed that the ball had made five perforations in different loops of the intestine. The

only chance of recovery in this case would have been by immediate intervention.

G. L. Simmons, of Sacramento, ¹⁴⁷_{Sept., '95} believes the present line of treatment requires us, in all cases involving the contents of the abdominal cavity, to make an exploratory incision. He recalls many cases in his experience of gunshot wounds where the post-mortem examination showed that, if an abdominal section had been performed, there would have been a fair chance of recovery.

P. Dubujadoux ²⁴³_{Aug., '95} considers that, in a case which ended fatally after laparotomy, the parietal incision was too short. Had he opened the abdomen beyond the umbilicus he would have had a better view of the intestine and have been able to irrigate more extensively, thus preventing the peritonitis which developed in the upper portion of the field of operation.

Gulotta ⁵⁸⁹_{p. 184, '95} reports 13 laparotomies for penetrating abdominal wounds; in 6 cases the operation was simply exploratory and was followed by recovery. Of 5 cases in which the intestine was wounded in one or more places, there were 4 recoveries and 1 death, due to a wound which had passed unnoticed. Of 2 cases of hepatic wounds, 1 recovered and the other died on the thirty-third day from pneumonia and pleuro-hepatic abscess. The author concludes from these cases that laparotomy is always indicated in penetrating wounds of the abdomen, even if it be only done for exploratory purposes, and he characterizes as retrograde the position of those who do not intervene because it may be dangerous for the patient. Three cases of laparotomy for penetrating wounds of the abdomen, with a report of fifty-six cases, led C. L. Scudder, of Boston, ⁹⁹_{July 26, '95} to the following conclusions: Given an abdominal wound, proof of penetration through the peritoneum should be sought by enlargement and careful investigation of the original wound. Penetration having been found, immediate enlargement of the wound should be made for careful exploration of the abdominal contents. A. T. Cabot, of Boston, ⁹⁹_{July 26, '95} stated that he had no reason to change the opinion expressed by him four or five years ago in regard to the great importance of always opening the abdomen in the case of penetrating wounds. If the intestines were not injured, he did not think that enlargement of the opening through the abdominal wall added at all to the danger, while, of course, if injury to the intestines had occurred, the opening and repair of that injury added greatly to the chances of recovery.

Treatment.—James G. Mumford, of Boston, ⁹⁹_{July 26, '95} after a study of thirty-eight cases treated at the Massachusetts General Hospital and a large number reported in the literature of the subject of stab and gunshot wounds, considers that nearly all extravasations

are fatal. Stomach wounds with extravasation are fatal; without, they are generally recovered from. The same is true of the small intestine; but extravasation follows most small-intestine wounds, while it does not follow most stomach wounds. A low death-rate from hæmorrhage is due to early checking by operative procedures. He concludes that: 1. Gunshot wounds show a much higher mortality than stab wounds, but those stab wounds which penetrate the viscera show a mortality equally high. 2. Wounds of the small intestine are usually fatal. Wounds of the stomach may be survived. 3. Barring hæmorrhage, early death after the accident is not from shock, but from sepsis, the latter being met with only when extravasation takes place.

The manner in which extravasations may be assisted in their infective work by remedial procedures merits attention. In regard to the question of flushing out the abdomen when it is presumably infected by septic material, J. W. Elliot, of Boston, ⁹⁹July 25, '95 stated that he feared it, owing to the likelihood of spreading the infectious process to remote regions. He preferred to wipe out the parts. H. W. Cushing ⁹⁹July 25, '95 has come to the conclusion that if there has been really septic material in the abdomen, either from injury of the intestine or a collection of pus which happens to be virulent, washing out does not save the patient. The principal advantage of irrigation, which he uses largely, is to remove matter (small clots; contents of cysts, tubes, etc.) which may decompose if left; but when really virulent material has got into the abdominal cavity, washing it out has frequently failed to give him the satisfaction hoped for.

Cabot said that he did not consider it proper to irrigate the peritoneal cavity in cases in which local septic processes already exist, but that in these cases, when seen early, when the septic process had not started, and the object was to remove a great amount of clotted blood and faecal matter in as thorough and unirritating a way as possible, to do this he knew of no better way than by irrigation with a bland solution. M. H. Richardson thought that, in appendicitis in which the general peritoneal cavity is invaded by the breaking down of adhesions, the germ colonies are spread to other parts of the abdominal cavity by irrigation.

Lothrop ⁹⁹July 25, '95 stated that one of Scudder's cases brought up a point of extreme interest,—namely, the occurrence of inflammatory processes in the omental stump, coming, as a rule, late after the operation. About two years ago Bull first called attention, in a report of cases, to the occurrence of this inflammatory process after the abdominal wound had healed and the patient was apparently to have an uneventful recovery. These cases showed no trouble

whatever before the latter part of the fourth or sixth week up to the sixth month, the abdominal wound being perfectly closed, one case having no trouble whatever until six months had elapsed. Some recovered perfectly by simple expectant treatment with local applications; others went on to suppuration. From one of these abscess-cavities a pint of pus was evacuated, and in the cavity was found the ligature which had been applied previously to the omental stump. As regards the symptoms of these cases, they varied according to the degree of inflammation and to the time at which they appeared after the primary operation. Most of the pain and tenderness was in the umbilical region, and in many cases there were tumors to be felt. The causes of these symptoms were due to sepsis; he was inclined to think that the tying of large masses of omentum in one ligature, or a large mass in two ligatures in the form of a chain, and leaving considerable omentum distal to the point of ligature, would end in a consequent necrotic process interfering with nature's efforts to destroy the few germs which may have been left there, and finally resulting in a slow, chronic suppuration calling for surgical interference. In amputating portions of the omentum the chain ligature should be used, including a large number of links; the omentum distal to the ligature should be cut off as near the ligature as is consistent with safety; individual arteries should be tied separately so as to prevent hæmorrhage,—occasionally a serious complication.

To show that, notwithstanding great injury, recovery may be obtained, Bennett ^{Jan. 19, '96} reports a case in which sixteen bullet-holes of the intestines were found and closed in the cæcum, ileum, and jejunum; after washing out the abdomen by using three or four quarts of sterilized warm water, considerable clotted blood and faecal matter that had oozed through the wounds came away. The abdominal wound, including the peritoneum, was closed with silk stitching, leaving iodoform gauze at the lower end of the wound so that it reached down into the pelvic cavity. Iodoform was sprinkled over the edge of the cut surface and the wound dressed with iodoform gauze and absorbent lint, and over all a roller bandage applied. An uneventful recovery took place.

Shepherd, of Montreal, ^{Dec. '94} exhibited a patient who had been severely gored by an ox and the intestine and mesentery wounded; the right testicle was exposed, and a large wound on the left side of the abdomen extended from the spine of the pubis upward and outward several inches; through this wound protruded some ten to twelve feet of bleeding small intestine covered with dirt. The mesentery was perforated and torn in eight or nine places, and, on disturbing the clots, the vessels bled profusely. The intestine was

torn completely through in only one place, but in several other spots the outer and middle coats were torn and the mucous membrane extruded. After appropriate treatment the man recovered without a bad symptom. Scott, of Kansas City, ⁷²_{Dec., '94} reports a remarkably rapid recovery in a robust man who, one hour prior to his arrival at the hospital, had received six serious stab-wounds,—three in the chest, the pericardium and the lungs being penetrated, and three in the abdomen, one of which caused a large portion of the omentum to protrude. In two weeks he was up and able to go home.

Albarran, of Paris, ¹⁵²_{Feb. 9, '95} reported the case of a pregnant woman who was shot in the abdomen. Five hours after the accident laparotomy was performed and four distinct perforations were found in a loop of the small intestine in a length of twenty centimetres. This part was resected and the intestine was sutured end to end. Then a ligature was placed on a branch of the mesenteric artery. But, in addition to this, there was a double opening into the gravid uterus, through which escaped a loop of the umbilical cord, which was folded among the intestines. The cord was replaced and the openings into the uterus were closed with sutures. The day following the injury the patient aborted. Recovery was afterward complete.

In examining the intestine in a case of stab wound, Rieder ¹⁴_{Jan. 3, '95} discovered that two loops of the intestine each presented three perforations and that there was a wound four centimetres long in the bladder. As the mesentery was seriously injured at the level of the second loop, Rieder resected all of this portion—viz., sixty-two centimetres of the small intestine—and united the ends with Murphy's button. The other wounds were simply sutured. Except for a slight cystitis, recovery was uneventful. Murphy's button was eliminated naturally, and the patient was entirely well seven weeks after the accident.

C. B. Burr, of Flint, Mich., ¹³⁹_{Feb., '95} reports the case of a lunatic who was discovered in the act of attempting to disembowel himself, using the case-knife with both hands. A laceration of the walls of the stomach, about four inches in length, which involved the serous and muscular coats and extended diagonally across the lesser curvature, was found, besides an opening into the stomach large enough to permit the passage of the little finger, through which partially-digested food was forced. The patient recovered under appropriate surgical measures.

Contusion of the Abdomen.

Berndt ³⁰¹_{v. 39, p. 516} emphasizes the difficulty of establishing with certainty a diagnosis of intestinal rupture after a severe contusion

of the abdominal wall and the importance of an early recognition of the rupture, to render timely laparotomy possible. In simple cases vomiting is repeated but two or three times; when the intestine is ruptured it is persistent and intractable, and in the latter case there is also disappearance of liver-dullness, as pointed out by Moritz. The appearance of peritonitis, if lesions of other organs can be excluded, is also an important sign. Regarding operative measures, Berndt states that an exploratory laparotomy, after contusion of the abdomen, is usually to be avoided, and that in uncertain cases expectant treatment should be adopted. If, twenty-four to thirty hours after the injury, there are signs of sepsis, operation is contra-indicated; a low temperature with marked constitutional symptoms is an especially unfavorable condition. If, however, there is unmistakable evidence of rupture of the intestine, immediate laparotomy is indicated. Rapidity and accuracy being essential in these cases, he prefers to make at once a long incision permitting a rapid examination without handling. He objects to resection of the torn portion and to antiseptic flushing of the abdominal cavity.

The symptoms of rupture of the intestine are not always such as to call attention to the seriousness of the condition present. In a case seen by Hitchcock, of Detroit, ¹⁹_{Dec. 8, '94} no decisive symptoms were observed. There had been vomiting and pain referred to the end of the penis. Crackling over the seat of injury led to a diagnosis of rupture, and laparotomy was performed. The colon was found torn, its contents being in the abdomen. The patient died shortly after being taken from the table. Lambret, of Lille, ¹⁴_{Feb. 10, '95} reported the case of a man who, after a severe fall, felt a sharp pain in the abdomen, but who was able to walk to the hospital, principally to have a cut lip attended to. On the next day the abdomen was tense, but not tender; liver-dullness had disappeared, and there was no abnormal tympanites. He had vomited twice, had passed urine, had evacuated gas *per anum*; the temperature was 37.6° C. (100° F.), the pulse 120 and feeble. Laparotomy was performed and revealed gas and intestinal contents in the peritoneal sac, peritonitis, a small perforation of the ileum, and a complete division of the jejunum near its beginning. The wounds were sutured, but the patient died half an hour after the operation. The author, contrary to Berndt, pleads for early exploratory operation after every contusion of the abdomen, if the pulse does not promptly improve, no matter how slight the abdominal symptoms may be.

That the gravest abdominal injuries may co-exist with either the slightest or with no external evidence of mischief is well shown

by six cases (three of which are here given) reported by Thomas Bryant, of London. ⁶_{Nov. 2, '65} The first case was a man, aged 40, who walked into Guy's Hospital after having received a kick on his abdomen from a horse. He appeared to be so slightly injured that his friends wished to take him home, for he was neither sick nor collapsed, and only complained of local pain where he had been kicked. As a means of precaution he was, however, put to bed. He died within thirty-six hours from acute peritonitis. At the necropsy, besides evidence of general peritonitis, intestinal contents were found in the peritoneal cavity, and great difficulties were experienced in finding the seat of the rupture; indeed, the bowel was carefully looked through twice without success, and it was only by distending the bowel slightly with water that the leak was found in the small intestine, through an opening about one-sixth inch in diameter, situated about three feet below the duodenum. The edges of the opening were everted and the opening was covered with lymph. A second case was that of a boy, aged 13, who, after a blow on the abdomen, walked a mile with but little assistance, and when he died, thirteen hours after the accident, the duodenum was found to be completely torn across. Another man, aged 25, walked into Guy's Hospital, after receiving an abdominal injury, and complained only of local pain. He lived thirty-six hours and died collapsed. After death his duodenum was found to be ruptured.

Kirmisson ¹⁵²_{No. 14, '85} ⁸⁰_{June 15} calls attention to the difficulty in the diagnosis of intra-peritoneal lesions incident to abdominal contusions. He states that the alteration in the quantity and quality of urine passed is sometimes of distinct value, but cites one case of le Fort's in which there was absolute anuria. Autopsy showed rupture of the intestine, but no injury of the bladder. Kirmisson holds that intervention should depend upon the gravity of the symptoms. In the discussion of this paper Reynier stated that, in spite of unending debates upon this question, no conclusion has yet been reached which can guide the surgeon in deciding for or against operation. In most of Michaux's cases where laparotomy was performed it was evident that recovery would have ensued without this procedure. He recently treated a patient six hours after a severe blow in the region of the stomach by a transverse bar. The man vomited and had a rapid pulse; two days later he was well. Chavasse has collected 36 cases of kick in the abdomen by horses, 35 of which died. Kirmisson stated that a man who has been kicked in the abdomen by a horse has one chance out of three of dying. He had saved more than one-half his cases, thanks to intervention, although it is true that some

cases were opened which might have recovered spontaneously. The laparotomy did no harm. He holds that intervention should be practiced when there are sharp local pains and rapid elevation of temperature. Delorme, in 9 cases of contusion, saved 7 without intervention. In the other 2 there were no symptoms which positively indicated surgical interference.

A case of contusion of the abdomen with rupture of the thoracic duct, ending in recovery without operation, is recorded by Thomas H. Manley, of New York. ⁹_{Nov. 2, '94} The obscurity of diagnosis here was an interesting feature, and in this instance it is evident that an exploratory cœliotomy would have accomplished no good, but, on the contrary, would probably have very much diminished the patient's chances of recovery.

In considering the differential diagnosis between simple contusion and contusion accompanied by visceral lesion, John B. Deaver, of Philadelphia, ¹²⁰_{Mar., '95} calls attention to the importance of the sympathetic nervous system, which has its largest distribution in the abdominal cavity. In simple contusion the absence of severe characteristic pain, of constant vomiting, of the anxious expression and presentiment of impending death, and of any evidence of loss of blood, together with the occasional presence of suddenly-developed meteorism, will be sufficient to establish the differential diagnosis. The meteorism is due to paralysis of the muscular coat of the bowel, consequent upon concussion of the plexuses. In some cases, however, it is difficult to say whether there is or is not a visceral complication; and here the surgeon should wait but a few hours, when, if improvement is not apparent, an operation should be performed. When the solid viscera are the seat of injury hæmorrhage is the chief danger, and pain and exsanguination afford the clue. If the patient should react, which is unusual, unless the kidney is the injured organ, there will be, in addition, dullness in percussion on the flank. Rectal or vaginal examination may afford aid in determining the presence of a collection of blood in the pelvis.

Treatment.—Février and Adam, of Nancy, ⁹⁹⁶_{Oct. 25, '94} from an experimental study on dogs, noted that, in animals with intestinal perforation, there was constriction of the intestine above and below the point of injury, and a swelling of the intestinal loop at the point of lesion, this being of a peculiar consistency, showing a sort of elastic resistance. They also noted that the lesions were always superposed one upon the other in the direction of the spine; so that by going from the injured portion of the wall toward the spine, the wounded loops could always be found. These points have a certain importance, as they may facilitate search for in-

testinal lesions in man, and avoid the necessity of proceeding to complete evisceration.

According to Balladur,²⁰⁰⁰₉₅ contusions of the abdomen complicated by visceral lesions, and especially intestinal lesions, being almost always followed by death, require rapid surgical intervention, and, as there is no pathognomonic symptom, the surgeon is justified in making an exploratory laparotomy. This should be made in the median line and should be followed by methodical examination of the viscera. According to the author's figures the results of intervention are superior to those of the expectant plan, the mortality being 66 instead of 97 per cent.

In reporting a case of wound of the intestine by the kick of a horse, Frœlich⁸²⁷_{Mar. 13, '95} stated that effusion into the pelvic cavity in such cases may be avoided by practicing drainage at the most inclined point, either from without inward or from within outward. In the first, a sound being introduced into the rectum, an incision six or seven centimetres long is made to the right, in the middle of a line from the postero-superior crest of the ilium to the most projecting point of the tuberosity of the ischium. The skin, cellular tissue, and insertions of the gluteus maximus are resected and the fibres of the pyramidal traversed above the lesser sacro-sciatic ligament, if it cannot be depressed from above. The vessels and nerves are situated lower down and farther out. The finger is introduced into the pelvic cavity, the rectum felt, the peritoneum drawn out with a forceps, and a button-hole incision made, into which a large drain is inserted. The peritoneum may be sutured to the skin. If laparotomy has been previously performed, drainage is established from within outward. By means of a Woelfler forceps, armed with a drain in the shape of a cross, the tissues are perforated above the lesser sacro-sciatic ligament, the incision being made inward and downward, just clearing the sacrum. The point of the forceps grazes the skin in the middle of the ilio-ischiatic line; incision of the skin at this point will give exit to the forceps and the drain, the latter being thus fixed in the cavity by its cross-shaped extremity.

SURGERY OF THE SPLEEN.

Splenectomy.

In the course of some valuable observations on the present status of the surgery and physiology of the spleen, James P. Warbasse, of Brooklyn,¹⁵⁷_{Jan., '95} described the case of a female patient in middle life, in the practice of L. S. Pilcher, in which the spleen was greatly increased in size. Examination of the

blood showed the number of red cells to be reduced to 2,600,000 per cubic millimetre and the number of white cells increased to a ratio of 1 white to 43 red. Pilcher advised against removal of the tumor. Later, a gentleman from another city attempted its extirpation, but had to desist and leave the operation unfinished because of the excessive hæmorrhage encountered. The patient died a few hours afterward, evidently from acute anæmia and shock. A second case was that of a man between 60 and 70 years of age, who came under the care of Pilcher some eight months ago. The tumor was somewhat larger than that of the above case. The last examination of this patient's blood, made six weeks before report, showed 2,880,000 red cells to the cubic millimetre and a blood-cell ratio of 1 white to 7 red. Notwithstanding this high degree of leucocytosis, moderate anæmia, and enlargement of the spleen, the patient's general strength has improved; he is now up and about, and has very little to complain of, aside from malaise and the physical presence of the tumor. This is evidently a pronounced and hopeless case of lienal leukæmia. Warbasse has consulted the statistics of surgical operation for the relief of cases of this character, and finds that of 124 cases of laparo-splenectomy 63 died as a result of the operation and 61 recovered; 5 more died in a short time, either from the operation or from a continuation of the disease. This gives a mortality of 54.8 per cent. In view of these figures, it is evident that there is a considerable discrepancy in the mortality in the different classes of cases.

Warbasse states that there are on record thirty cases of laparo-splenectomy in which investigation of the blood has been made after the operation. Nineteen of these are of special value because in these an exact record of the condition of the blood was made both before and after the removal of the spleen. After the operation, in a large number of these cases, there was a rapid increase in the number of white blood-cells and a diminution in the number of red cells. He quotes Péan's case of cystic spleen, in which the blood-cell ratio sank to 1 to 200 after the operation, due to an increase in the number of white and a diminution in the number of red cells; and Zesas and Vulpius, who made experiments upon healthy animals and found that splenectomy is followed by a rapid increase of more than 100 per cent. in the number of leucocytes within nineteen days after the operation. From this high point the number gradually sank till it reached normal on the sixty-fifth day. The number of red cells diminished 20 per cent. during the first nine days, and then gradually increased to normal.

Two successful cases of splenectomy are recorded by J. M. Neel, of Bonham, Tex.,⁸⁵ who outlines the indications and contra-indications for the operation. It is unjustifiable in leucocythæmia or where the lymphatic glands are involved, but indicated in tumors, simple hypertrophies, or where there are pressure-symptoms causing loss or suppressed function of any other organ; severe paroxysms of pain, or where it is proven rebellious to simple measures and attended with dangerous or serious disability. In movable or displaced spleens, requiring interference, extirpation is preferable to operative fixation. H. B. Delatour, of Brooklyn,⁹⁶ calls attention to thrombosis of the mesenteric veins as a cause of death after splenectomy.

John B. Roberts, of Philadelphia,⁵ gives a description of a case in which the dislocated spleen, occupying the right iliac region, was mistaken for an enlarged and displaced liver. A radical operation for an umbilical hernia revealed the error in diagnosis.

Spanton² reported 3 cases; 2 of these were fatal. He gives the details of 93 cases, showing that the death-rate of splenectomy (exclusive of leucocythæmia) had improved from 80 per cent. in the decade 1865-75 to 51.85 per cent. in 1875-85 and to 19.35 per cent. in 1885-95.

Marriott, of London,² successfully removed a spleen from a woman, aged 30 years, who had a small ulcer on the vulva. The organ was considerably enlarged and the seat of numerous tubercles, which histologically presented the structure of bacillary lesions. After excision the ulcer on the vulva healed; the latter was possibly tuberculous and the source of the splenic infection. No enlargement of lymphatic glands was observed clinically in any part of the body. The presence of bacilli had not been demonstrated. Ceci, of Genoa,⁹²¹ reported two successful cases of splenectomy, and James Murphy, of Sunderland,² another.

Movable Spleen.

Hartmann¹¹²⁶ has observed four cases of movable spleen, in two of which he practiced splenectomy, the other two being treated by a bandage. The first case was that of a girl of 18 years, who had had intermittent fever and a large and painful spleen. Two years ago she was attacked with vomiting and symptoms of peritonitis. Twelve days afterward the spleen was extirpated. It weighed 2190 grammes (70 ounces) and the pedicle was twisted twice. Since the operation the patient had been well. The second case was that of a woman, 40 years of age, suffering from symptoms of dyspepsia, and who was suddenly attacked by severe

peritoneal phenomena. The spleen was very large. Splenectomy was performed in April, 1894, and the health of the patient had since been excellent. The third patient suffered from frequent attacks of pain, which disappeared on wearing a suitable belt. The fourth patient, a woman 56 years of age, had complained for three or four years of digestive disturbances, and whose spleen was prolapsed, but perfectly reducible and not hypertrophied; the stomach was prolapsed and dilated and the right kidney was prolapsed. Hartmann advised a suitable belt, but the case is too recent to judge definitely of the results.

At the German Surgical Congress, Rydygier, of Krakow, ³³⁶_{July 6, '95} reported a successful splenopexy three months before on a patient with a movable spleen. He made an incision in the median line and dissected up the peritoneum at the level of the eleventh and twelfth ribs, making a pocket in which he lodged and fixed the spleen and passed the fixation sutures through the gastro-splenic ligament. Up to the time of report the spleen had remained in place.

Plücker, of Cologne, ³³⁶_{Oct. 5, '95} ¹⁵_{Dec., '95} relates a case in which Bardenheuer fixed the spleen outside the peritoneal cavity in the loose subperitoneal tissue. The patient was a strongly-developed woman of 23 years, who had been married five years, had aborted twice, and had suffered from considerable trouble with her genital organs. For some time a tumor had been noticed, on vaginal examination, in the neighborhood of the left ovary, and this was taken to be some growth connected with the uterine appendages. On opening the abdomen, it was found, however, to be the spleen, somewhat enlarged, and attached in the upper part of the abdominal cavity by a long pedicle. The concavity of the diaphragm was found to be so extremely high and difficult to reach that Bardenheuer determined to fix the spleen extra-peritoneally. The uterus, which was retroflexed, was attached to the anterior abdominal wall in a normal position by sutures, and the hypogastric wound closed. The patient was now laid on the right side and a longitudinal incision made in the left loin, reaching from the tenth rib to the crest of the ilium. Another incision was made at right angles to the upper border of this, extending forward so that a rectangular flap could be detached forward, consisting of the skin and muscles. The hand was now inserted beneath the ribs, and opened up the loose fatty and connective tissue under the left side of the diaphragm. The peritoneum was opened up by as small an incision as possible, and the spleen, pushed up by an assistant's hand, was passed through the opening into the bed prepared for it. The parietal peritoneum was then sutured to the serous covering of the

pedicle, and the communication with the general cavity thus closed off. To fix the spleen a thread was passed around the tenth rib, and also through the lower end of the viscus. A number of smaller threads were also used to secure it to the detached fascia and connective tissue immediately below that structure. Catgut was used to close the peritoneal cavity, and silk-worm gut for the fixation stitches. The abdominal wound was closed in layers, and the patient made an uninterrupted recovery. The author, in conclusion, comments favorably on the less danger and the easier technique of this proceeding as compared with Rydygier's. There is no trouble with the intestines, and the organ can be much more certainly and accurately dealt with.

Kouwer ⁸_{Oct. 24, '95} quotes two cases of his own in which a method like Rydygier's in principle was performed about four years ago. Complete recovery and disappearance of the symptoms resulted in one case, and the woman was well at the time of writing, in spite of the unanatomical position of the spleen. In the second case, also a woman, the prolapse was operated on successfully, but re-appeared after another pregnancy; it was not too great then, however, to be kept up by a pessary. The spleen remained deep in the iliac fossa, and could easily be reached *per vaginam*. Kouwer considers his operation—the spleen being simply fixed in a lumbar wound, the latter being then allowed to heal up—simpler and much less dangerous than that of Rydygier.

Runge, of Göttingen, ⁴_{Apr. 22, '95} extirpated the spleen in a young woman who complained of distension and pain in the abdomen and gastric symptoms. In the pelvis a tumor the size of two fists was felt. Uncertain whether he had to do with a prolapsed kidney or spleen, Runge performed laparotomy, and found the tumor to consist of the spleen, with a very long pedicle twisted once on its axis, and its veins full of clotted blood. He removed it, and the patient recovered. There were no symptoms of leukæmia.

Wounds of the Spleen.

Louis McLane Tiffany, of Baltimore, ⁹_{Nov. 17, '94} reports a case of gunshot wound of the spleen and kidney, in which he performed abdominal section and secured hæmostasis by deep suture in the following manner: A long needle threaded with silk was passed entirely through the spleen central to and parallel with the bullet-track; the long ligature was then tied over the free border of the organ so as to press the surfaces of the wound together tightly enough to arrest bleeding, yet not to tear through the splenic tissue; the ends of the ligature were cut short, the peritoneal cavity cleansed by copious irrigation with hot water, and the

abdominal wound closed. The kidney was tamponed with gauze through the dorsal wound. Convalescence was uneventful; the anterior wound healed by primary union; urine flowed from the dorsal wound for two days only, union by granulation taking place. The patient left the hospital well in a couple of weeks. The classical treatment for a perforating wound of the spleen is splenectomy, because it has been held that bleeding is not otherwise to be stopped. In case the wound is larger than in the instance here reported, it would be necessary to interfere without delay and pass several sutures in the manner stated, so as to make pressure over a larger area. When rupture of the spleen has occurred this method of hæmostasis seems especially indicated, for thereby support to the injured viscus would be afforded.

Cysts.

Hahn,⁶⁹ July 11, '95; ⁸⁰ Sept. 16 in describing a case of splenectomy for hydatid cyst, refers to seven cases of this affection treated by splenectomy, of which five recovered. If the removal of the tumor is prevented by firm adhesions, the wall may be stitched to the abdominal incision and incised either immediately or at a second sitting. The author warns against tapping, owing to the high mortality, and states that the removal of the spleen, made necessary by injury or cyst, is without any real disadvantage to the individual, although it may be dangerous in certain diseased conditions, as leukæmia.

Snegisjeff,⁴⁷⁵ Apr. '96; ² May 11 reports a case of echinococcosis cyst which he removed from the spleen by the following method: The tumor was the size of a man's head. The incision was in the linea alba. The jet of steam was directed on to the larger convexity of the spleen, and the subjacent tissue at once became white and dry. A completely bloodless incision, seven inches long, was then made through the splenic tissue and the tumor was peeled from its surroundings by the finger. Whenever hæmorrhage, which was sometimes violent, occurred, it ceased at once when steam was directed on to it, and in this way the whole tumor was shelled out. The steam is best superheated to 150° to 200° C. (302° to 392° F.). In the case of soft organs the steam must not be at high pressure and must always be directed obliquely on to the bleeding spot.

Technique of Abdominal Operations.

The Murphy Button.—Murphy, of Chicago,⁶ Apr. 27, '96 gives an analysis of the reported cases treated by the button up to the present time. Gastro-enterostomy for malignant disease shows 27 cases with 9 deaths. Four of the patients died of exhaustion, 2 from imperfect operation, and 3 from peritonitis due to infection

at the time of the operation; 5 deaths, therefore, out of the 9 were due to preventable causes. In the performance of cholecyst-enterostomy Murphy's list deals with 38 cases with only 1 death. No other single method has shown such results. It is, however, in the carrying out of intestinal approximation that the button has been of the greatest value, because the conditions dealt with by that measure have, up to the present, been among the least satisfactory in surgery. The recorded examples include 12 cases of resection of gangrenous bowel in hernia, with 2 deaths; 14 cases of resection in intestinal obstruction, with 1 death; and 9 cases of resection for fæcal fistula, with no death. There were, in all, 48 cases of resection for non-malignant conditions referred to, and of these only 3 died. Thirty cases of resection of intestine for malignant disease are given, with 7 deaths. In all these instances of resection the divided bowel is united end to end by means of the button.

W. A. Chamberlin, of St. Charles, ¹⁰⁵_{June 16, '96} presented to the Minnesota Academy of Medicine the stomach and segment of duodenum removed from a patient dying of gastric carcinoma, exactly three months after a gastro-enterostomy by the button. In three months the opening had not contracted by a hair's breadth and could not have contracted, as there was absolutely no redundant connective tissue. The author has used the button five times. Two cholecystenterostomies were perfectly satisfactory, the button passing in one on the twelfth and in the other on the fourteenth day.

Willy Meyer, of New York, ⁹⁶_{Jan., '96} had used the Murphy button in eight cases, one on the ascending colon and one on the rectum, and had experienced no obstruction. One of the cases died ten weeks after the operation, of acute intestinal hæmorrhage, and showed post-mortem metastatic growths all over the intestine and manifold adhesions. The point of anastomosis could be detected only by the presence of a few silk stitches which had been inserted during the operation. There was not the slightest contraction. The linear cicatrix was about three millimetres wide and the anatomical result ideal.

Charles A. Morton, of Bristol, ²_{Oct. 19, '95} gives the sequel to a case of lateral anastomosis by means of Murphy's button, published earlier in the year. ²_{Apr. 20, '95} The patient was aged 27, and suffered from intestinal obstruction due to a malignant stricture at the junction of the cæcum and ascending colon, for which the cæcum was opened, with complete relief. The growth in the cæcum invaded the abdominal wall around the colotomy opening, and the inguinal glands became affected and could be felt under the scar

of the incision for the anastomosis. Three months after the anastomotic operation the patient died. The contraction then of the opening made by the button in Morton's case was only one-fourth inch in three months, with constricting new growth around it. In Keen's case, ⁹⁶_{p.663,'94} one in which the cut end of the ileum was joined to the side of the sigmoid flexure and the junction was examined forty-seven days later, the button measured one inch in diameter and the opening one-half inch, showing contraction to half of the original diameter. The entire colon at the point where the anastomosis was made was narrowed to one inch in diameter, the diameter of the colon toward the splenic flexure being one and seven-eighths inches and at the rectal end two and one-half inches.

Parkhill, of Denver, Col., ⁹_{Oct.12,'96} reported a case in which enterocolostomy was performed for the exclusion of a cæcum and ascending colon which was riddled with fæcal fistulæ as a result of appendicitis, the largest-size Murphy button being employed. Three months later an operation was done for the excision of the diseased cæcum, at which the finger was passed into the colon, and the opening at the site of the anastomosis was found to be so small as to barely admit the tip of the index finger as far as the base of the nail. The circumference of the finger at that point was two inches, while that of the button which had been employed was three and one-fourth inches.

In a case of intestinal anastomosis by the Murphy button in an advanced case of cancer of the colon and stomach, under the care of Mayo Robson, of Leeds, ⁶_{June 15,'96} necropsy showed that the button had fallen into the bowel on the proximal side of the stricture, and, the stricture being impassable, it could not have been parted with. Although in an incurable case this was a matter of no importance, in other cases the imprisonment of the button might make a great difference to the patient. Robson thinks that the difficulty might be overcome by making the distal flange of the button slightly larger than the proximal.

J. Paul Bush, of Bristol, Eng., ⁶_{Apr.6,'95} calls attention to the quickness of operating by means of the button, and suggests making the expanded part of the button of decalcified bone, thus enabling a larger size to be used.

Donald D. Day, of Norfolk, Eng., ²_{Apr.20,'96} reported a case of enterectomy in which the Murphy button was used. The point of special interest is the long delay in passing the button,—sixty-six days,—which is, he believes, the longest on record. Murphy specifies that cases of existing peritonitis are unfavorable for satisfactory union of the bowel, which one would quite anticipate.

Last year's ANNUAL contained a report of the results obtained

by Chaput, of Bordeaux, in a series of experiments to ascertain the mean calibre of the human intestine. This author considers the twenty-seven-millimetre Murphy button far too bulky for the small gut in general, and especially for the lower end of the ileum. Of the three sizes he prefers that which is about equal to twenty-one millimetres in diameter; it is the smallest, and adapts itself to the situation more readily than the others.

Quénu⁷³_{Dec. 1, '94} does not agree with Chaput in this belief, but attributes any failure with the button to faulty technique. He has found that when it is well adjusted the button prevents the escape of any liquid from the intestine.

Willy Meyer, of New York,⁹⁶_{Jan., '95} also remarked upon possible danger of gangrene from use of a button of too large size, and of obstruction if one too small were used on the large intestine. He proposed, in using the button on the large intestine, to begin with repeated small doses of a cathartic on the third or fourth day. In a case operated by Abbe, of New York,⁹⁶_{Jan., '95} the wound was freely opened on the sixth day, and there was found sloughing of the intestine on either side of the button, and extravasation of feces in the region of, though not into, the peritoneum. In another case autopsy showed no peritonitis, but an empty colon below the button and a hard plugging of feces in the button, which formed complete obstruction.

Abbe⁹⁶_{Jan., '95} added a case to Van Arsdale's in which the button had fallen back into the stomach. In Abbe's case the patient did not pass the button, and it was found, six weeks later, to have fallen back into the loop of bowel on the proximal side of the union. This defect led Kammerer⁹⁶_{Jan., '95} to prefer suture in gastro-intestinal anastomosis; but he thought that in certain cases of intestinal anastomosis, and especially in cholecystenterostomy, the button could be employed with great facility.

W. P. Swain, of Plymouth, Eng.,⁶_{Mar. 23, '95} recorded a case of cholecystenterostomy with the use of Murphy's button. Fifty-two days after operation the button had not appeared, and the author suggests that its non-appearance may be accounted for by its falling back into the large cyst instead of being carried into the intestine.

In a case of cholecystenterostomy performed with Murphy's button, reported by F. J. Shepherd, of Montreal,²⁸²_{Apr., '95} a hæmorrhage occurred on the fourth day. On opening the abdomen a large clot was found about the seat of the anastomosis, and the gall-bladder was distended with blood-clot. There were found no signs of sepsis, the peritoneal cavity being perfectly normal. On examination of the button-anastomosis the origin of the hæmor-

rhage was at once found. The button had cut through the thick and friable gall-bladder and could be easily seen. The hæmorrhage came entirely from the gall-bladder.

Howard Lilienthal, of New York, ¹¹⁵⁰_{Apr., '95} has concluded, from his experience, that, if accidents happen, one should be sure, before laying the blame upon the instrument, that all proper and necessary precautions were taken. The button should never fit tightly into the gut-lumen. In all doubtful cases gauze drainage from the line of union should be employed. The danger-signal after operations of this kind is less pain and fever than persistent vomiting,—the cardinal symptom of strangulation of any abdominal viscus.

[Since the above was written Shepherd has read Murphy's paper, ⁹_{Feb. 9, '95} in which he says that the operation of cholecystenterostomy in malignant disease is very unsatisfactory, as several deaths occurred in eight operations, none, so far as he can make out, from hæmorrhage, though it is well known that the tendency to hæmorrhage in those suffering from carcinoma is very great. Murphy also states that now, when he finds a large carcinoma of the pancreas, duct, or neck of the gall-bladder, he abandons the operation.]

J. R. Johns ⁹_{Jan. 19, '95} reports an interesting case of strangulated inguinal hernia in which it was found impossible to reduce the bowel after herniotomy. Eighteen hours later, when the sac was re-opened, about two feet of small intestine were found black and lifeless, and a fæcal fistula was therefore established. Excision of the dead bowel was performed in the second week, and in the third week all dead tissue had been removed. Convalescence progressed rapidly, and about one month after the first operation intestinal resection and end-to-end anastomosis was made by means of Murphy's button, and, although the total loss of intestine was thirty inches, recovery was rapid and complete. The successful treatment of this case is the more deserving of note, since the patient suffered from cholera morbus of a severe type during the first week.

Abbe presented to the New York Surgical Society ⁹⁹_{Oct. 19, '94} a specimen from a case of strangulated hernia, in which five inches of gangrenous bowel had been resected and an anastomosis effected by Murphy's button. The patient died forty-eight hours after the operation, and it was found at a second operation, performed shortly before his death, that the weight of the button had caused it to gravitate to the bottom of the pelvis, and produced a sharp kink at the site of the anastomosis.

A case was reported by W. W. Stewart, of Columbus, Ga.,

who states ⁵⁹_{Sept. 15, '94} that the button, as now manufactured, is of nickle-plated brass. The button can, he thinks, be improved upon by substituting aluminium for the brass, thereby reducing its weight, which will facilitate its passage from the intestine.

[Aluminium would be dangerous metal to use for the purpose, owing to the influence of the secretions, which cause it to disintegrate in the form of acicular scales, as shown when employed for the manufacture of tracheotomy tubes.—C. E. S.]

F. H. Wiggin, of New York, ⁶¹_{Nov. 3, '94} reported a case in which he had performed intestinal anastomosis, and also the results of twenty experiments which he had made on dogs. The dangers of the Murphy button he considered to be numerous. It was occasionally retained, necessitating a second laparotomy for its removal; the spring of the button was made sometimes too strong, so that it would cut through the intestine; the weight of the button might, as in a case cited, anchor the bowel in a flexed position, and so cause obstruction; it was liable to become plugged with hard faecal matter, and, lastly, the sharp edges of the small, lateral openings were very liable to cut through all the coats of the intestine except the peritoneum. He preferred Maunsell's method, which was adapted for any portion of the intestine and could be readily and safely performed by any experienced surgeon.

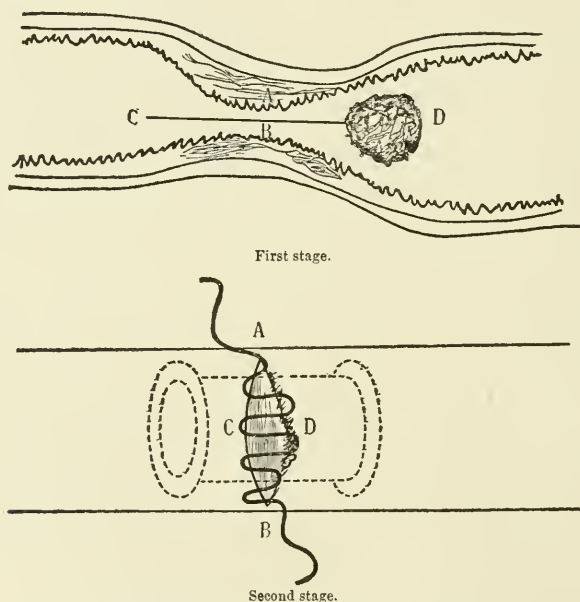
König ³³⁶_{No. 4, '95} states that he has never met with an instance in which death from shock had followed intestinal resection and anastomosis, and that in this he is supported by the majority of his German colleagues. While, therefore, recognizing the fact that modern methods of establishing intestinal anastomosis by bone plates, metal buttons, etc., favor rapidity of operation, he considers them rather as a disadvantage than an advance, as far as the patient is concerned, and is not disposed to substitute them for the older and, what he considers, safer operations.

Dawbarn ⁹⁶_{Feb., '95} expressed the opinion that, when the patient is capable of sustaining a long operation and the surgeon possesses exceptional skill in dealing with these cases, anastomosis by suture is the ideal method; for the majority of cases, in the hands of the average surgeon, Senn's plates are to be preferred. The use of the Murphy button has been shown to possess inherent disadvantages which should restrict its use to those cases in which it is necessary to hasten in order that the patient may survive the shock of the operation.

James Bell, of Montreal, ²⁸²_{p. 481, '95} concludes that in the button we have a valuable aid in end-to-end anastomosis of the intestine. It is, of course, not essential to success, but the great desiderata, rapidity of operation and accuracy and security of coaptation, are

both admirably effected by this instrument. Bell opposes the view that it is chiefly useful in the hands of the tyro and is not essential to the experienced surgeon, pointing out that the chief difficulty in any proceeding of this nature lies not so much in the absolute intestinal coaptation as in the steps of the operation which precede this final stage. If a surgeon is incapable of uniting the intestine by suture, he is certainly not fitted to undertake any such operation by any method. Again, the button may be used deep down in the pelvis, where accurate union by suture would be almost impossible.

New Procedures.—A modification of the operation of entero-



OPERATION FOR ENTEROPLASTY. (ROBSON.)

First stage, showing incision from fistula D through to C. Second stage, showing sides of incision A and B drawn apart and ends C and D.

Lancet.

plasty for simple stricture of the intestine, by the use of decalcified-bone bobbins, is presented by A. W. Mayo Robson, of Leeds, Eng. ⁶ Aug. 3, '96. He describes the case of a patient in whom there was a faecal fistula midway between the umbilicus and the right antero-superior spine of the ilium. While the fingers would easily pass upward, nothing larger than a No. 12 catheter would pass through a stricture fully an inch in length just below the fistula. After passing a director through the stricture, which was evidently cicatricial, it was divided in the direction of the length of the bowel. A decalcified-bone bobbins was then inserted and

the cut edges were brought together transversely over it, as shown in the diagrams. A continuous catgut suture was used to unite the mucous margins, and a silk suture the serous surfaces, thus restoring the continuity of the intestinal channel. After carefully cleansing the surrounding structures, the peritoneum, aponeurosis, and skin were apposed in the usual manner. The patient suffered very little from shock, and the bowels were moved naturally on the second day. The deeper parts of the wound healed by first intention, the superficial by granulation. The patient's general condition began to improve at once, and she has never had any bowel trouble since. Robson claims the following advantages for his procedure: 1. Rapidity of execution, only two continuous sutures being required,—one for the mucous margin and the other for the serous. 2. An immediately patent and efficient channel, preventing tension above the newly-joined gut. 3. Protection to the line of sutures until the lymph has become partly organized.

Herbert W. Allingham⁶_{Aug. 31, '95} describes a new device, which consists of a bone bobbin somewhat after the style of Mayo Robson's. The tubes are of bone or ivory, the shape of two hollow, truncated cones with their lesser ends together, having the appearance of small dice-boxes. These are carefully decalcified to within about three-sixteenths of the centre, leaving at the junction of the two cones a hard, unyielding portion, upon which any pressure from the sutures is borne. The ends of the tubes are quite soft.

Landerer, of Leipzig,³³⁶_{Mar. 30, '95} ⁹⁶_{Aug.} has invented the following method of quickly uniting the two ends of divided intestine without the dangers and objections inherent in the button of Murphy. As yet he has tried it only upon dogs and cadavers. A cylinder is cut out of a potato or turnip. This cylinder is perforated by a hole made with a cannula or grooved chisel, is beveled at either end and traversed about its middle by a circular groove. (Fig. 1.) This groove is 1 to 1.3 centimetres long and $\frac{1}{2}$ to 1 centimetre deep. It is in shape very like the bone cylinders of Neuber. These cylinders are made in various sizes before the operation and disinfected in sublimate solution 1 to 1000. The two ends of intestine are brought over this cylinder. The intestine is first fastened by a running suture passed through the intestinal wall over and over the edge of the gut. (Fig. 2.) The two ends of the loosely-applied suture must be crossed at the place of tying or a little puckering will result, through which intestinal contents can pass. In Landerer's first two cases a small faecal abscess formed at this place. It was shut off and did not interfere with recovery. The suture need not be applied so near the end of the gut as is shown in Fig. 2, but more of the intestinal wall may be

included. It may be inserted three to five centimetres from the edge. Landerer begins this running suture at the point opposite the insertion of the mesentery and allows the threads to cross before tying. If the knot is made on the side toward the mesentery, irregularities are less easily discovered. With the help of this suture—as with the tobacco-pouch suture used with the Murphy button—the intestine is pushed over the cylinder so that it rolls into the groove, and the suture is drawn up like a shir-string

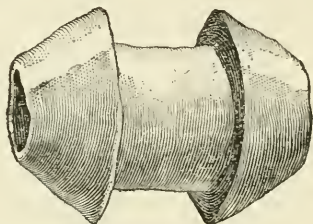


FIG. 1.

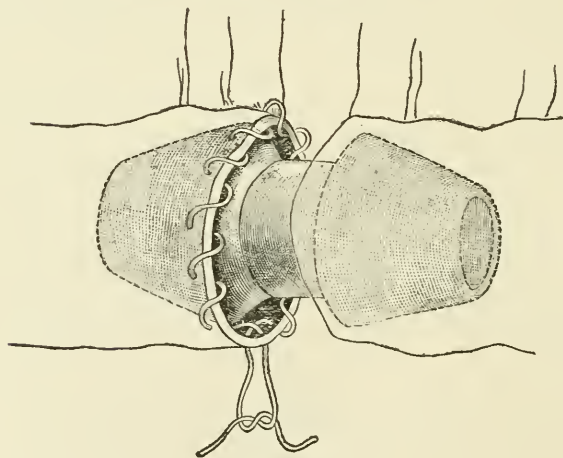


FIG. 2.

METHOD OF QUICKLY UNITING THE TWO ENDS OF DIVIDED INTESTINE. (LANDERER.)
Centralblatt für Chirurgie.

and tied, and its serous surfaces come together. In some cases it has sufficed to apply simply a single suture at the mesenteric insertion to prevent the gut from pulling apart. Healing in these cases was perfect. A few interrupted sutures or a running sero-serosa suture may be applied. These sutures are applied very easily, because the surfaces are held nicely in position by the underlying cylinder. It suffices to apply simply a serosa suture at the mesenteric insertion and one on the opposite side of the intestine.

Duplay and Cazin¹⁰⁸_{Dec. 1, '95} propose a substitute for the Murphy button in the shape of a metallic cylinder upon which ligature *en masse* of the two ends may be practiced. Experiments on dogs showed that the piece was easily put in place, having no special mechanism; that the operation was rapid and certain, as the surgeons controlled the amount of constriction; that gas and feces passed off better, owing to the relatively large diameter of the cylinder (eighteen millimetres, instead of seven). The metallic piece was passed on the third or fifth day after operation.

Sutures.—Ullmann, of Vienna,³³⁶_{Jan. 12, '95}⁹⁶_{Aug.} states that the Murphy button forms a means of securing rapid union, but that by its use security is sacrificed to rapidity. Although he was one of the first in Vienna to try the button, he has now discarded it for Maun-

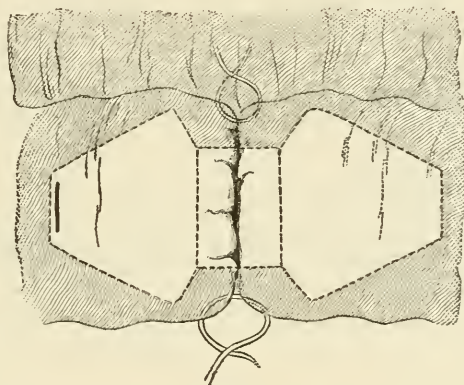


FIG. 3.

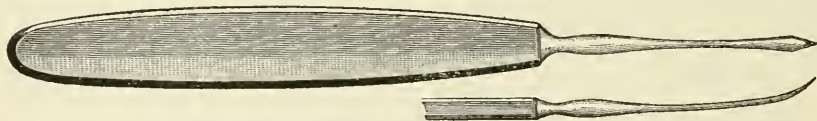
METHOD OF QUICKLY UNITING THE TWO ENDS OF DIVIDED INTESTINE. (LANDERER)

Centralblatt für Chirurgie.

sell's operation, slightly modified by himself,—four fixation stitches, instead of two, being introduced into the gut before invaginating the upper into the lower end.

In discussing the subject of circular suture of the intestine, Bier, of Kiel,²²⁶_{B. 49, H. 4, '95} states that he attaches no importance to the use of very fine needles, but prefers Hagedorn needles of medium size, on account of the ease with which they can be handled. Suture is made at separate points, first at the level of the mesenteric attachment, then on the opposite side, and finally in the intermediate portion. The needle, introduced five or six millimetres from the resected edge, comes out at the edge and follows the same course in an opposite direction at the other resected end. For the last sutures, however, the needle, of necessity, comes out nearer the edge. The muscular coat should be comprised in the suture.

By this procedure circular suture of the intestine may be performed in from fifteen to twenty-five minutes. Bier severely criticises the more complicated methods, believing that the decalcified-bone plates of Senn and the Murphy button present more inconveniences than advantages. In the majority of cases the simple Lembert suture is sufficient, and Bier has also used it for entero-anastomosis.

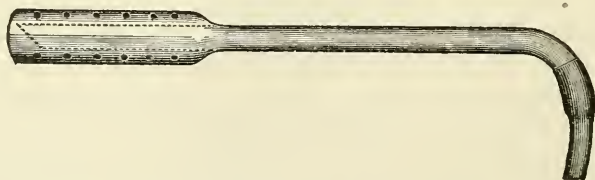


NEEDLE WITH EYE CLOSED BY A SPRING. (HAUCHON.)
Journal de Médecine.

In certain particularly difficult cases Czerny's two-row sutures are useful, as affording greater security.

Ralph Waldo, of New York, ⁵⁹_{Feb. 9, '95} described a new method of closing the abdominal wound, the object of which was to further diminish the liability to hernia. The walls being composed of three layers, one suture is placed near the edge of the wound, passing down under the second line and out of the opposite side, at a point corresponding to point of entrance. A second suture is entered at a greater distance from the edge of the wound, passing down through the three lines or layers of the abdomen, and out on the other side. Waldo is positively opposed to buried sutures in the abdominal wound, because of the hiding of suppuration if any be present.

Instruments.—Hauchon ²⁴_{Oct. 20, '95} presents a needle with an eye simply closed by a spring, which threads the needle when lightly



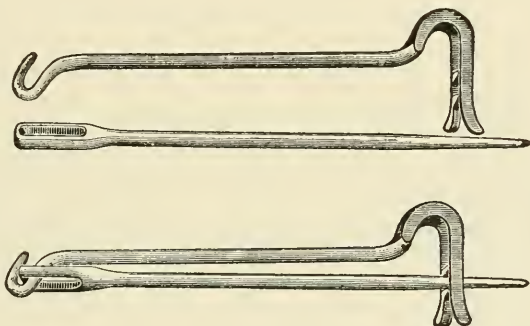
DRAINAGE-TUBE. (KELLOGG.)
Journal of the American Medical Association.

pressed upon. The instrument is very thin and especially suitable for intestinal suture, as it can be curved according to the needs of the case.

An improved metal tube for draining the abdominal cavity after lavage in abdominal sections is presented by J. H. Kellogg, of Battle Creek, Mich. ⁶¹_{Feb. 23, '95} The device, illustrated in the accom-

panying engraving, consists of a metal tube about one centimetre in diameter, the lower end of which is inclosed in a cage, which not only guards the tube laterally, but, by extending a little beyond the lower end of the tube, also protects its lower extremity.

W. S. McLaren, of New York, ^{June 8, '95} feeling the need of a light clamp for preventing the escape of intestinal contents while performing anastomosis, devised a clamp, as illustrated in the cut, with a permanent hinge and lock. The advantage of the hinge is that it can be quickly adjusted and very thoroughly cleansed. At the time of an operation the two parts should be separated. The operator has then simply one straight needle to handle while piercing the mesentery. When this is in place the other part is hooked through its eye and brought down until it locks.



CLAMP FOR PREVENTING ESCAPE OF INTESTINAL CONTENTS. (McLAREN.)
New York Medical Journal.

HERNIA.

General Considerations.

Bertillon, of Paris, ^{Dec. 4, '95} in a paper recently read before the Academy of Medicine on the frequency of hernia, stated that this was independent of race, but appeared to be in relation to easy circumstances or the reverse. The recruits coming from the Paris districts inhabited by a well-to-do population are freer from hernia than the recruits from poor districts. Among members of the literary profession hernia is rare. Between the ages of 5 and 15 the condition is uncommon. After 40 years of age the proportion rapidly increases.

J. Kynaston Couch, of Swansea, ^{Oct. 26, '95} states that a family history of hernia has not often been brought forward; a case seen by him is of interest in this particular. The patient's both parents had been affected,—the father with the right scrotal hernia common to his father, brother, and son; the mother also had a femoral hernia. It would seem most probable that the lad inherited his

defect—overpatent inguinal rings—from his father, but the laxity of tissue present in his mother's case and shared by his sister, as shown by their possession of femoral herniæ, may have counted for something in the size of the protruded mass.

Berger, of Paris, ^{Oct. 26, '95} has met with 7433 cases of hernia in the male and 2534 in the female during a period of three years' consultation at the Central Bureau of Assistance in Paris, among patients applying for bandages. Inguinal hernia constituted 96 per cent. of these cases, 6220 of the men suffering from this form, double in 4126 cases and single in the rest, occupying the right side in preference to the left in the proportion of 1.46 to 1. Of all the cases a congenital origin could be definitely ascertained in only 479 cases.

Radical Cure of Hernia.

Results.—In a discussion of this subject, E. Kummer, of Geneva, ¹⁹⁷ _{Nov., '95; Nov. 15} states that among the recruits for the Swiss army 3.23 per cent. were rejected on this account; while Berger has estimated that in Paris 2.77 per cent. of the inhabitants are the subjects of hernia, and in the whole of France their number is probably 5 per cent. of the population. The complications arising from this condition are, in the first place, strangulation, which, according to Berger, arises in 2.46 per cent. of the hernial patients, while the death-rate in Switzerland from this cause alone ranges from 2.6 to 3.4 per 1000. As regards post-operative relapses, every hernia which forms at the site where a radical operation has been previously undertaken must not be looked on necessarily as a relapse or re-appearance of the original trouble; many such manifestations are due to a new formation. A successful operation has dealt satisfactorily with only one of the causative factors mentioned above,—the weakness of the abdominal parietes; but, at the same time, it does not touch the other and, indeed, may have increased its power by the return of viscera to the cavity, thus augmenting the intra-abdominal pressure. Probably those relapses which are due to some defect in the operative technique or to some post-operative failure will show themselves within a twelve-month, while those due to some other condition which cannot be dealt with surgically are often delayed till considerably later. In discussing the causes of such relapses Kummer considers that infection and even suppuration play but little part unless they lead to removal or sloughing out of the deep stitches, thus bringing about disunion of the edges of the wound. The situation of the hernia, moreover, has a considerable influence on the tendency to recurrence. Inguinal hernia in females and umbilical or epigastric

herniæ present the most favorable prospects for a radical cure; but if the patient is exceedingly obese and the edges of the gap in the linea alba much thinned, umbilical hernia may be most difficult to deal with. Femoral herniæ, too, are not very easy to cure satisfactorily, owing to the great depth at which the neck of the sac lies and to the anatomical peculiarities of the crural canal, with the femoral vein on one side and with the rigid pubic bone and Poupart's ligament on the other. It is exceedingly encouraging to note that in that variety which, *prima facie*, presents most difficulty—viz., the inguinal—statistics prove that the results are becoming more and more satisfactory, and that without having recourse to Kraske's radical suggestion that castration should be undertaken. Free resection of omentum should always, when possible, be undertaken, so as to reduce the amount of the abdominal contents, while, wherever there is a tendency to enteroptosis, an hypogastric belt should be subsequently worn. As to figures, Lucas-Championnière gives 275 operations, with 17 relapses; Kocher, 220, with 15; Bassini, 262 cases, with only 7 recurrences; while Macewen speaks of 98 patients, with but 1 return. The length of time which the patient is kept away from his work varies considerably, Macewen enforcing six weeks in bed and two months away from work, while Kocher keeps them in bed for only seven to eight days and allows them to return to work after a fortnight. The mortality, of course, varies a good deal with the surgeon, but in the hands of a first-class man the risks are extremely small; thus, Kocher reports 220 operations without a death; Macewen, 98, with 1 death, and that from scarlatina; Bassini, 250 cases, with 1 death from pneumonia; and Lucas-Championnière, 266 operations, with 2 fatal cases,—1 from internal strangulation and 1 from pulmonary congestion. As to the character of the operative proceedings, Kummer emphasizes especially the need of ligating the sac as high as possible; torsion is not recommended, since it may produce necrosis, as occurred in a fatal case of Girard's; the displacement of the neck of the sac is of little prophylactic value; while the use of an organic button, made either of the sac or of a detached portion of omentum, is not thought to be of any real advantage. Finally, the greatest stress is laid on the need of firmly closing the hernial canal by sutures passed through the neighboring muscular and aponeurotic structures.

Roux, of Lausanne, ³¹_{Dec. 4, '96} remarks on the varying periods at which alteration of the tunics takes place in different cases, the rapidity of this alteration explaining the difference in the mortality figures between radical cure and herniotomy done as a last resort.

In the latter case Roux has had 22 per cent. of deaths, while in the former he has only had 3 deaths in more than 800 operations. One of these deaths was not imputable to the operation. An anæsthetic should be avoided, if possible. Cocaine has a great hyposthenic action, and ether, which, generally speaking, is to be preferred to chloroform, increases the predisposition to pneumonia, which is present in every case of hernia operated on.

G. Ekehorn ^{370 673}_{V. 57, No. 4, Sept., '96} states that the weak point of Bassini's operation is the cutting of the oblique externus muscle, which may lead to gangrene, especially of the middle portion, and which may become disseminated through the medium of the silk suture; and, even should the wound heal, the spot at which the aponeurosis has been cut remains weak. Ekehorn, therefore, omits this detail of the operation, together with the row of sutures which it necessitates, and connects Poupart's ligament with the lower border of the deeper abdominal muscles by a single pair of deep sutures,—a procedure somewhat more difficult than Bassini's, but equally effective. (Report of Corresponding Editor Eklund, Stockholm.)

[The cutting of the aponeurosis of the external oblique muscle is an absolutely essential step in Bassini's operation. Without it the high ligation of the sac is impossible. The fear of gangrene is purely theoretical, and practical experience shows it to be groundless.—B. and C.]

Hume, ²_{Nov. 30, '95} from the results in twenty-six cases operated on by him, concludes that failures arose chiefly from the stump of the sac being left to occupy the internal ring, and that the most important item was to close the latter satisfactorily.

William S. Halsted, of Baltimore, ⁵_{July, '96} publishes a short article in which he emphasizes the advantages of his method of radical cure of hernia, which, as will be remembered, owes its peculiarity to the fact that the cord is transplanted upward so that it comes out of the abdominal wall through muscular structures previously entirely intact. Halsted insists that his method was original with himself, that it was published prior to the publication of Bassini's operation, and is, therefore, in no sense to be regarded as a modification of that procedure. To the claim of Bassini, that, by his method, absolutely normal conditions may be brought about, Halsted replies that such a complete restoration is impossible. The only modification which he proposes to his original operation is the use of silver wire for closing the large wound which he makes in transplanting the cord. He states that he uses silver-foil to cover the sutures, but the exact method is too vaguely described to be well understood. Halsted claims to have

had no recurrence of hernia after his operation, excepting in cases where suppuration occurred.

[Silk was originally used by Halsted for the buried sutures, and abandoned on account of the tendency to form sinuses and to become extruded. We believe that silver wire or any other non-absorbable suture is open to the same objections as silk.—B. and C.]

The surgical treatment of hernia is discussed by W. B. de Garmo, of New York, ^{May 11, '95} who, after describing the Czerny operation of 1876, the Macewen operation of 1886, the McBurney operation, and, finally, the Halsted and Bassini operations of 1890, outlines the results in each. He favors the Bassini and Halsted operations because the canal can be cleared of all foreign substances by these operations. Then repair begins at the internal ring and the structures are restored to as normal a condition as possible. Any method that fails to remove all abnormal tissue or that uses suture material quickly absorbed invites failure. The mortality has been reduced from 8 per cent. to a small fraction of 1 per cent.

Radical operation for inguinal hernia is considered by Kocher, of Bern, ^{226 1170} _{v. 60, H. 1; Aug., '95} who recommends a slight change in his former technique. It will be remembered that he originally drew the sac up through an artificial opening made above the internal ring in the external oblique aponeurosis, and, after twisting it strongly with forceps, fastened it down upon the outside of the inguinal canal. On account of suppuration following this torsion in several instances, he has decided to do away with the twisting of the sac altogether, and now, instead of turning the sac down over the inguinal ring, he fastens it up above the artificial opening through which he has drawn it. Kocher claims that all the cases operated upon by his method were free of recurrence, with the exception of those performed by his assistants, who were not always fully conversant with the method.

[Any method of operation which makes use of the sac as an artificial barrier to recurrence is open to grave objection. There is no evidence that it strengthens the canal, and to leave such a poorly-nourished tissue invites suppuration and, therefore, recurrence.—B. and C.]

W. B. Coley, of New York, ⁵ _{May, '95} in a paper on the operative treatment of hernia in children, with a report of one hundred and thirty-three cases, states that the technique of the Bassini operation is not generally understood, owing to the few accurate descriptions that have appeared in English. He outlines the important steps in the operation as follows: 1. The external incision begins at a

point nearly or quite on a level with the antero-superior spine, continues obliquely downward, parallel with and about one-half an inch internal to Poupart's ligament, and ends at the centre of the external ring. 2. The incision is rapidly carried down until the aponeurosis of the external oblique is freely exposed for a distance of two and one-half to three inches; a director is then passed through the external ring just beneath the aponeurosis and the aponeurosis is divided well above,—*e.g.*, one-half to one inch above the internal ring. 3. The cut edges of the aponeurosis are held up with forceps and dissected free from the underlying muscles as far as the edge of the rectus internally and externally until the shelving portion of Poupart's ligament has been clearly exposed. 4. The sac and cord are then isolated *en masse*, and this is best accomplished with the fingers and blunt-pointed curved scissors. If the peritoneal layer of the sac be first reached, the dissection is easy, rapid, and bloodless. 5. The cord and vessels of cord are now separated from the sac, and this, too, is best done with the fingers. The separation is carried high up within the internal ring, and the sac is ligated or sutured where it merges into the general peritoneal cavity. 6. The cord is held up and the edges of the aponeurosis rolled back, while from three to five buried sutures are introduced beneath the cord. These are best introduced from within outward, and should include the internal oblique and transversalis muscles, the transversalis fascia (and sometimes the edge of the rectus) on the inner side, and the deep shelving portion of Poupart's ligament on the outer side. The lowermost suture should embrace the conjoined tendon. 7. The cord is now replaced and the cut aponeurosis is closed over it by means of a continuous suture, extending as near the pubis as possible without causing undue constriction of the cord. 8. Closing the skin wound with interrupted sutures, without drainage, completes the operation. In all his cases the dressings were moist iodoform-and-bichloride gauze, held firmly in place by rubber plaster, over which cotton and a muslin spica were applied. The scrotum was always left unexposed. Fixation was secured by means of a plaster-of-Paris spica, extending from the edge of the ribs to the ankle. This was kept on until the first dressing, or about the eighth day. The skin sutures are entirely of catgut. None of the cases, with the exception of two or three of the early ones, operated upon by suture of the canal with catgut, have worn trusses since the operation. Of the one hundred and twelve cases operated upon by the Bassini method, with kangaroo-tendon for the buried sutures, not a single relapse occurred and not a single case has worn a truss.

The radical treatment of inguinal hernia in childhood is discussed by Bittner,²²⁶_{B.49,H.4;}⁵_{Oct.,'95} who believes that there are many cases of hernia which are not curable by the application of a truss, and that the cure in many cases may have been brought about by preventing the further distension of the sac and its growth with the development of the individual. He believes operation preferable since (1) there are those which require the constant wearing of a truss, (2) there are herniæ which cannot be held up by a truss on account of the size of the external ring, (3) there are occasionally severe complications following the use of a truss in these cases, (4) trusses are to be avoided, if possible, since their effect on the social and mental condition of the patient is frequently great, and (5) in all cases of operation for strangulated hernia the radical operation should be done. The operation is very well borne by children, recovery taking place, on the average, in ten days. The author reports 34 cases with 38 herniæ, with 1 relapse and 1 death in a child that was found to be markedly tubercular. The operation was simple suture of the canal.

[We believe that the author condemns the use of the truss in childhood too strongly. This period is by far the most favorable for curing hernia by mechanical means, and we have failed to note any bad effects upon the mental condition of children.—B. and C.]

The radical cure of inguinal hernia in a child by the implantation of a section of aseptic sponge to occlude the internal ring was performed by Walter B. Platt, of Baltimore,⁵⁹_{Dec.7,'95} who opened the inguinal canal in the usual way, reduced the hernia, took a small piece of sponge, washed it thoroughly, made it completely aseptic by boiling, put it in the conjoined ring, and sewed it in, with the idea of keeping the hernia in place and having the sponge organized. Three months later the boy could run about and play, the hernia stayed up, and the sponge has caused no disturbance; so that it must have become organized.

[The implantation of a sponge or of any foreign body in the hernial canal for the cure of hernia is one without rational foundation and should be condemned. The scapula of a dog was once used for the same purpose, with failure as a result.—B. and C.]

The conclusions drawn from the table of final results in the service of W. T. Bull at the New York Hospital, as given by Foote,¹_{Aug.31,'96} are as follow:—

Of 55 cases of inguinal hernia heard from after the operation, 10 recurred, or 18 per cent.; of the 36 cases of healing by primary union, 4 recurred, or 11 per cent.; of the 19 cases in which there was suppuration, 6 recurred, or 31 per cent. Viewed from an operative standpoint: Of 11 cases where the sac

was ligated, 5 recurred, or 45 per cent.; of the 5 cases where, in addition to the ligation of the sac, the canal was sutured, 1 recurred, or 20 per cent.; of the 39 cases where, in addition to the ligation of the sac, the cord was transplanted and the canal and external ring were closed, 4 recurred, or 10 per cent.

These figures may not be exact, as the time of report is, in some cases, too short to speak of a permanent cure; but their relative value is certain, and they show clearly enough that primary union is more favorable to permanent cure than granulation, and that the operation known as Bassini's is better than the operations in which the cord is not transplanted. In most of the Bassini operations kangaroo-tendon was used to suture Poupart's ligament and the conjoined tendon.

Carless, of London, ²²_{Sept. 26, '94}, ⁶⁷³_{Jan., '95} operated on a man, aged 20 years, who for some years had been suffering from interstitial hernia in the inguinal region. In stripping the structures of the cord from the neck of the sac it became evident that some abnormal condition was present; so the sac was opened, the index finger inserted, and it was then found that a marked constriction existed opposite the external abdominal ring. Beyond this the sac again became dilated into a large pocket filled with omentum, more or less adherent to the wall and situated between the abdominal muscles. It had to be shelled out of its bed like a tumor; it was then opened above the constriction, the loose omentum was drawn down, and a considerable mass of it ligatured in portions and removed. The neck of this upper portion of the sac was dealt with by transfixion and ligature. The external oblique muscle was divided along the line of the inguinal canal, so as to enable the surgeon more accurately to bring into apposition the upper curved fibres of the external oblique and Poupart's ligament. The external oblique aponeurosis was also secured by a row of superficial stitches and the wound closed by continuous suture, no drainage being employed. Carless laid emphasis on the importance of opening the inguinal canal so as to enable the somewhat-depressed fibres of the internal oblique to be seen and accurately sutured.

Andrews ¹⁰⁵²_{Aug., '95}, ⁸⁰_{Oct. 15} describes what he thinks may justly be entitled "A New Operation for the Radical Cure of Hernia." The earlier operations that were employed failed, the author says, because (1) unless a hernial protrusion be stopped at its point of outlet,—namely, the internal ring,—no amount of closure below will surely prevent its recurrence; but (2) if it be effectually blocked by the repair of this weak point, no attention need be given to the parts below. Even the extirpation of the sac is not

absolutely necessary, excepting that portion lying in the canal. The acceptance of this view would relegate to obscurity all the older literature of the subject up to the time of Bassini, including the work of Wood, Heaton, McDowell, Bell, Barker, Nussbaum, Czerny, Sewell, and others. The author states that an extended experience leads him to assert emphatically that the sealed aseptic wound will remain aseptic in this locality and that no other will. Drainage is therefore to be avoided.

An incision is made parallel to Poupart's ligament, about three centimetres above it, and carried from near the pubis to a point a little above the internal ring. The superficial epigastric artery is always cut and tied. All steps of this operation must be clean and bloodless. Failure to arrest the hæmorrhage during its progress will interfere with the subsequent steps. Directly beneath the skin incision, after complete hæmostasis, another of equal extent is made parallel with the coarse fibres of the external oblique, which are always tendinous here. The lower termination of the incision is near the external ring, which the author finds need not be divided in all cases. A scrotal sac can always be drawn up without injuring the external ring, and, if the testicle is found to be adherent, it may be returned to its proper position by the same route through which it came out.

The canal being cleared of all structures but the spermatic cord, the latter is lifted gently from its bed and held by retractors during the real preparative work. The posterior wall of the canal, up to and including the internal ring, is narrowed by suturing the conjoined tendon and the transversalis fascia firmly to Poupart's ligament from below upward with a kangaroo-tendon suture. The imbrication, which is the special feature of this operation, consists in the incorporation of a strong layer of external oblique aponeurosis into the posterior wall of the canal along with as much conjoined tendon and transversalis fascia as can be found, and the preservation of another flap of the same strong fascia to form the anterior wall. The purpose is to lap joints in uniting the several layers of the wound. The author claims the following advantages for this method: 1. A large, strong flap of any needed size to fill the internal ring. 2. Triplicate layers of aponeurosis. 3. Interlocking layers giving broad surfaces of union. 4. Shortening of anterior as well as posterior wall of the canal, making them mutually supporting and relieving tension on deep suture. 5. Cord amply protected.

[This method may be an improvement over Bassini's method in certain cases where the aponeurosis is very lax, but in most cases we believe the disadvantages from increased tension would more

than offset the advantages to be gained by the overlapping.—B. and C.]

In a report of one hundred and twenty-five cases of hernia in which the radical cure was performed, Ernest Laplace, of Philadelphia, ⁹_{June 8, '95} states that he uses a portion of the sac to act as a plug, excising the rest. In large sacs he lays open the lesions, closes the ring, and packs with iodoform gauze. He does not believe in following any one method. The ring he always considers as a wound through the abdominal wall, which it is his duty to close, either by sutures or by plugging with omentum or portion of the sac. There were two deaths in his series,—one from strangulated umbilical hernia in a fat woman and the other from hæmophilia and leukæmia. Bassini's method is safe and sure and prevents all danger of strangulation.

Delorme ²⁴³_{May, June, '95; Oct.} ⁵ reports his second and third series of 50 each of operations for the radical cure of hernia; he had 100 operative successes out of the 100 cases, but reports 2 deaths,—1 nine days after operation and the other three days; both were due to disease of the lungs, and he thinks only one can be ascribed indirectly to the operation. The sac was ligated with boiled silk. The parietal incision was united by interrupted sutures about one-fourth of an inch apart, approximating the two edges of the wound for about three-eighths of an inch on either side, thus shortening the abdominal parietes about three-fourths of an inch. Besides this suture the pillars of the external ring were stitched, using two or three sutures, leaving just sufficient room for the passage of the cord. Drainage was never employed, and the author is completely satisfied with that method.

The dressing included the abdominal region, the perineum, and the thighs. The patients were kept constipated for eight, ten, and twelve days, when the first dressing was removed. He has found that this constipation does no harm to the patients; there is no elevation of temperature, no gastro-intestinal disturbance, no decrease in appetite, and the first stool is easily produced by glycerin injections, their volume having been diminished by an animal diet.

Beresowsky ³⁰¹_{B. 40, p. 296; July, '95} ¹¹² gives an elaborate report of the operations for the radical cure of hernia as performed by Kocher in the Bern clinic. He submits the following conclusions: 1. That, in view of the absolute lack of mortality and only a small percentage of return, the expressed wish of the patient is a sufficient indication for operating. 2. That the size and duration of the hernia decreases the chances of success, both as regards healing and freedom from return. 3. The age of the patient has but little

influence on healing and only increases the probability of a return of the hernia. 4. In children the wound should be as hermetically sealed as possible, the sutures being placed close together, and no drainage used. Collodion dressing is to be applied. 5. Kocher's method gives results in no way inferior to those of Macewen and Bassini, and, by being much simpler, is less liable to disturbance in healing. 6. Enlargement of the veins should be treated by their removal. 7. The subsequent use of a truss is regarded as unnecessary.

[The results of Kocher's operation are altogether too recent to be compared with those of Bassini's operation. But comparatively few of Kocher's reported cases were done by his method.—B. and C.]

O. von Büngner³⁰¹_{B.38,H.1} gives the details of 84 cases operated on by a method which Küster has successfully employed since 1884, and which, in some respects, resembles the procedure of Lucas-Championnière. The sac is opened, and, its contents being reduced, it is isolated and drawn out strongly, tied as high as possible, and extirpated after section below the ligature. The stump is sutured and the ring is then occluded by means of deep sutures of silk or silver. The soft parts between the ring and the cutaneous wound are carefully united by several rows of continuous catgut sutures so as to leave no space in which secretions might accumulate. Finally the cutaneous wound itself is united by continuous silk sutures and covered with iodoform collodion. The author attaches great importance to the precision with which the different sutures are made. Of the 84 cases operated on 67 only could be followed up, and of this number 61, or 91 per cent., had not had a recurrence of the hernia. Of the 61 cases 50 had been operated on from two to eight years before and 11 for at least eighteen months. The author believes that the wearing of a truss favors relapse by causing atrophy of the tissues. A truss is at times necessary, however, in elderly persons who have been operated on for voluminous herniæ with large rings or in persons obliged to work very hard.

According to W. B. Coley,⁸¹⁴_{Dec.1,'95; Feb.29,'96} the objections to the non-absorbable sutures in hernial operations are not theoretical, but are based on actual experience. He has now observed *sixteen* cases in which these disadvantages have been emphasized. In the first case silk was used for the deep sutures. Three silk sutures have come out at different times, and relapse occurred four months after the operation. In the second case silk-worm gut was used. Healing occupied two months and relapse occurred shortly after. In the third case silver wire was used, and a

discharging sinus remained, which had to be opened up and the sutures removed. In the fourth case a sinus lasted for a long time. The hernia recurred. In the fifth case silk was used and a sinus remained. The hernia recurred. Similar results were observed in the other cases. In one of these a second suture required to be removed two and one-half years afterward and another three years and eight months after. His personal experience with non-absorbable sutures in hernial operations comprises three cases in which silk was used. One healed by primary union and a sinus developed afterward; the sutures came out and relapse occurred. In two cases operated upon by the Bassini method, in which silk was used, primary union was not obtained in either case. The sutures did not come out, and there was no recurrence of the hernia in one case. In the other all the sutures were extruded and relapse quickly followed. In two hundred and fifty cases of hernial operations in which he has used kangaroo-tendons for the buried sutures there has been no instance of sinus-development, and primary union has been secured in 96 per cent. of the cases. The constant suppuration in cases already reported so weakened the parts as to allow of the speedy recurrence of the hernia in nearly all of the cases. He believes, therefore, that non-absorbable sutures for hernial operations should be abandoned, unless those who advocate their use are able to show some advantages to offset the serious disadvantages demonstrated.

Recent experience has made J. B. Roberts, of Philadelphia, ⁵_{Sept., '96} more willing than formerly to attempt the radical cure of hernia by operation. His present attitude on the question he formulates thus: Inguinal and femoral herniæ in children, if reducible, should be operated upon only when large or painful; if irreducible, they should always be subjected to operation unless there is some special contra-indication. Umbilical herniæ in children seldom need operation. Reducible inguinal and femoral herniæ in adults should always be operated upon if large or painful, and when the patient's willfulness, lack of intelligence, or poverty makes it probable that a well-fitting truss will not be properly worn. Irreducible inguinal and femoral herniæ in adults should always be treated by operation unless some special contra-indication exists. Umbilical herniæ in adults, whether reducible or not, should usually be operated upon, and especially so in patients leading laborious lives and having voluminous abdomens difficult to fit with trusses. Ventral herniæ should usually be subjected to operation.

[We do not believe operation should be recommended in the majority of the voluminous and irreducible umbilical herniæ in

adults. The operation itself is a most formidable one, and the chances of cure are small. Much can be said in favor of operating upon these herniæ when small and reducible.—B. and C.]

The Bassini and Halsted methods have given such satisfactory results, with so small a mortality, that J. B. Deaver, of Philadelphia, ^{June, '95} believes that simple reducible hernia should be included among the indications. Granted that a hernia so treated showed a tendency to relapse after either of these operative procedures, the adjustment of a light-fitting truss will eliminate the probabilities of subsequent strangulation. The choice of operation must necessarily depend upon the individual case. The Bassini, with or without the Halsted modification, is applicable in the great majority of uncomplicated herniæ and to all cases of simple reducible hernia. When strangulation has occurred, it may be necessary to treat the wound after the method of McBurney. Between the Bassini and Halsted operations Deaver gives preference to the latter for the majority of cases. He agrees, with Halsted, that it is not always advisable to bring the cord out at the internal abdominal ring, but this should be determined by the condition of the muscles at this locality. By excising the superfluous veins of the cord the latter is reduced in size and, consequently, its opening of exit is correspondingly smaller, thus offering greater resistance to the entering wedge of the subsequent hernia. Another feature of the Halsted operation is the position which the cord holds when the operation is completed. The fact that the cord overlies the aponeurosis of the external oblique makes the new canal more circuitous and, therefore, less liable to be followed by a relapse than in the Bassini operation, where the cord lies below the aponeurosis. This further simplifies the operation by doing away with a second row of sutures.

Among the number of operations performed for the radical treatment of hernia, Deaver's record shows 100 cases, with 8 deaths,—2 following the radical treatment and 6 the operation for the radical treatment where strangulation existed. The deaths occurring in the strangulated cases were 5 inguinal and 1 umbilical.

[The reasons given for preferring Halsted's operation are purely theoretical. Practically, the results are in favor of Bassini's method.—B. and C.]

In a paper on the radical cure of hernia, C. S. Briggs, of Nashville, ¹²⁰_{Dec., '94} deduces the following propositions: 1. By reason of the persistence of certain anatomical conditions, not removable by any kind of operative manœuvre, all methods are likely to fail of obtaining a permanent cure. 2. The operation for the radical cure

of hernia should be performed not only in cases of strangulation, large irreducible hernia, and in reducible hernia not amenable to mechanical treatment, but, in view of the low rate of mortality attending such operations, is justifiable in all cases of hernia and should be resorted to more frequently. 3. The tendency to recurrence of hernia after any and all of the several methods at a longer or shorter time is no argument against the operation. Haemorrhoids recur after successful operations for cure in consequence of the persistence of anatomical arrangement of vascular supply, and yet no one will contend that the operation on that account should not be done. 4. All modern operations are based upon two essential steps,—viz., the removal of the sac, which is an abnormal production of the parietal peritoneum, and the reconstruction of the canal in such a way that it will be restored to its normal oblique course through the abdominal parietes. 5. There is no best operation for the radical cure of hernia. Different cases, presenting entirely different conditions, should be dealt with by that method which will best carry out the cardinal objects of the operation.

[The ordinary surgeon is not likely to become equally skillful in performing half a dozen different methods, and, moreover, the conditions do not vary sufficiently to make it wise to employ a number of methods. Bassini's or Halsted's method can be used in nearly every case of inguinal hernia.—B. and C.]

Coley ⁹⁶_{Apr., '95} reports the results of 200 cases of hernia treated by radical operation, between 1891 and 1895, with but one death,—due to double pneumonia. The cases varied in age between 5 months and 62 years. One hundred and thirty-eight occurred in children under 14 years of age. There were 12 cases of femoral hernia, 5 cases of umbilical hernia, 3 cases of ventral hernia, and 180 cases of inguinal hernia (17 females and 163 males).

The method employed in 15 cases was ligature of the sac and suture of the canal. Of these 15 cases 1 relapsed in 4 months (simple catgut sutures employed) and 1 relapsed in 3½ months (silk sutures used). In 11 cases, in which chromicized catgut or kangaroo-tendon was employed, no relapse had occurred, though all but 1 of the cases had been traced.

Bassini's method was employed in 165 cases. Of these cases, in 160 kangaroo-tendon was employed for the buried sutures. Of these, 1 died on the eighth day from broncho-pneumonia. Suppuration occurred in but 7 cases, and 95.5 per cent. healed by primary union. In the 7 cases of suppuration but 1 was more than slight, superficial suppuration. A truss was not used after operation except in 2 or 3 cases.

Of the foregoing 160 cases all but 6 had been traced, and not a single relapse had occurred. Two were well 3 to 3½ years; 30 were well beyond 2 years, and 76 were well more than 1 year. Five cases were operated upon by the Bassini method in which silk or chromicized catgut was used for the buried sutures. Suppuration occurred in 4 cases and recurrence in 1.

Of the 12 cases of femoral hernia 10 were traced and were free from recurrence. Of the umbilical and ventral, 1 had recurred.

The following is the summary of results in the 200 cases: 12 femoral, no deaths or relapses; 8 umbilical and ventral, no deaths and 1 relapse; 180 inguinal, 1 death and 3 relapses. All but 10 cases had been traced.

In comparing Bassini's method with Halsted's, which resembles it in the main features,—viz., high ligation of the sac and transplantation of the cord,—there remain two important points of difference.

In the Halsted operation nearly all of the veins are ligated. That this is unnecessary, except when the veins are in a varicose condition, the results of Bassini and others prove. The other point of difference is placing the cord external to the aponeurosis of the external oblique, covered by skin only instead of beneath the aponeurosis. It is easy to point out objections to having the cord so superficial, but, waiving objections, some advantages in having the cord thus placed should be brought forward. Such advantages have not been made clear.

On the other hand, when the wound has been closed by the Bassini method, the only weak point where the hernia is liable to recur is at the new internal ring or place where the cord emerges. The same weak place exists in the Halsted operation as well. In the Bassini, if a protrusion should begin, its further progress is resisted by the strong aponeurosis of the external oblique, through which it must force its way, or take a right-angled course, a distance of about two inches, until it reaches the external ring.

In Halsted's operation, when once it has started, it has only the skin and superficial fascia to oppose it, and we know how readily these yield. The results of the operation, immediate and final, are inferior to Bassini's, and until superior results shall have been demonstrated he believes we should continue to operate by Bassini's method. The technique is simpler, and after a little experience the operation can be performed in from fifteen to twenty minutes.

Massopust ³³⁶ ¹¹² has operated since 1888 upon 199 cases of inguinal hernia by the Bassini method. The cases were oper-

ated on at two sittings, the closure of the canal and the skin-union being postponed until the second sitting. From 40 incarcerated herniæ there were but 2 deaths and 4 others from gangrenous processes following the operation. The total mortality was 3 per cent. Sepsis and pyæmia occurred in 4 cases.

From the table supplied, 130 operations, after various periods following the operation, were examined as to a return of the rupture. For a definite cure at least two years should have elapsed. Only fifty-five observations at this interval were possible, and from these in 10 to 12 cases there was a return; this is about 20 per cent. In the 30 cases there was an interval of three years between the operation and the last examination. These cases must be regarded as absolute cures.

In a discussion of the subject at the meeting of the American Surgical Association, ⁵⁹ John H. Packard, of Philadelphia, _{June 1, '95} stated that he had arrived at the conclusion that in inguinal hernia the sac descends without any reference to the cord. The rupture is independent of relations to the cord. In many cases, although the sac may envelop the cord, it is distinct from it and easily separated. The speaker gave demonstrations by drawings of his theory regarding this matter. In most cases the hernia does not come down under the infundibulum fascia; but when it does, and it becomes scrotal, we have the infantile form of hernia. Dissections show the sac of the hernia and the sheath of the cord to be distinct and separate, except in the infantile form of hernia. He described his mode of procedure in operating for radical cure, adapted to his theory of conditions present. In this operation, after a curved incision through the skin, which is carried down to the sac, the finger being pressed up into the sac, the sac is stitched up and made to form a plug at the ring, and the cord is left untouched. After this any other operation may be done to supplement it, such as McBurney's.

McBurney did not believe that surgeons would ever return to the position they had abandoned,—that of leaving the sac. The sac having been removed, how shall we prevent recurrence of the hernia? The key of this accomplishment is in removal of the cord and placing it in a new position, together with entire obliteration of the sac. Closure of the inguinal canal so long as the cord remains in it is, of course, impossible. As to the operation which goes under his name, the speaker remarked that it was devised when the subject was very undeveloped. He does not feel at all satisfied with its results, in comparison with those of other operations more recently devised,—that of Halsted, for instance. In certain conditions of hernia his operation is still advisable, but

not in many cases. The greatest obstacle is met in a class of cases in which there is a large, distended canal and in flabby individuals. In absence of this condition his operation will, for the most part, be effective. But the chief point of its weakness is in the shrinkage of cicatricial tissue, especially in inguinal hernia.

Halsted, of Baltimore, stated that his operation is nothing more than sewing up the wound which nature and the surgeons have made. Upon the perfect accomplishment of this depends the permanence of results. He cautioned against the too indiscriminate removal of veins in his operation. This should be done only when they are enlarged, as their removal has been in several cases followed by loss of the testicle. But the chance of this, about one in fifty, should not deter from the removal of veins if the success of the operation appear to depend upon it. The removal of the sac has not been proved absolutely essential in all cases, but is very important, at least, in most. Three weeks are not too long to keep the patient in bed, and are probably not long enough. In a patient dying from another cause, twelve days after operation for hernia, the autopsy showed that the wound could be easily torn open. Another like case showed the same thing after about the same time.

Broca, of Paris, ¹⁶²_{Aug. '96} has performed 477 operations for radical cure in children under the age of 15 years,—14 for umbilical hernia, 41 for inguinal hernia in girls, and 395 for inguinal hernia in boys. Of all these cases, a single one, a boy, died from septic peritonitis. Broca therefore feels warranted in regarding the operation as a benign one, and therefore asserts that it should be undertaken in all complicated cases or those in which the hernia cannot be kept in place. Although strangulation, which is not common in very young children, yields readily to taxis, as a rule, operation should nevertheless be performed, especially when associated with ectopia. The result is generally, though not always, satisfactory as regards the position of the testicle, depending upon the length of the cord, which cannot be determined before operation. In the 50 cases of cyst of the cord operated on by him, Broca found it continuous with a point of the hernia. The various obliterative injections must therefore be superseded by extirpation, with radical cure of the hernia. In hospital cases Broca does not operate before the infant has been weaned, though he has found that successful results may be obtained in children a few weeks or even a few days old. Of 250 cases seen after six months, only 3 had had a relapse; 2 of these had again been operated on and definitely cured. Several of the children had had whooping-cough after the operation. Broca does not believe that the truss gives

results at all comparable with operation. Frequently it fails, and more frequently it produces an apparent recovery, but the hernia returns after a varying period of time. Cure is possible, but not the rule, from Broca's experience, and, besides, the truss must be worn day and night for many years, at the end of which the result is not always satisfactory.

The operation is the same for the child as for the adult: (1) incision of the inguinal canal through the anterior wall; (2) elevation of the cord *en masse*, longitudinal incision of the cremaster and the common fibrous and serous membranes,—three planes that can always be seen; (3) separation, with the finger, of the serous and fibrous membrane,—an easy matter if done in the right place; (4) ligature of the neck at the epigastric artery, and (5) suture of the inguinal canal. The operation ordinarily lasts ten minutes.

Injection Treatment.

Luton, of Reims, ¹¹⁸_{Dec., '94}; ²_{Jan., 19, '96} states that he has had good results, in the treatment of inguinal and umbilical hernia in infants, from injection, into the neighborhood of the ring, of an artificial serum, composed of phosphate of sodium, 5 parts; sulphate of sodium, 10 parts; distilled water, 100 parts. He injects 1 cubic centimetre (15 minims) under the skin with an ordinary hypodermatic syringe. A single injection may be sufficient, but in most cases three or four injections at intervals of a week are necessary. During the treatment the hernia should be retained by a simple pledget of cotton-wool retained by a bandage. The only unsatisfactory result met with was that in one case the intestine was allowed to come down, and the contraction of the ring set in so rapidly after the first injection that symptoms of strangulation developed; the hernia was reduced by manipulation, and the case made a rapid recovery. He reports 7 cases; in 1 cure persisted after two and one-half years; in another after fourteen months; in another after seven months; the other cases had been treated too recently to justify any statement as to permanency of cure. The mode in which the injections operate to bring about a closure of the orifice in the abdominal wall is not clear; in 1 case an injection into the thigh led to improvement in an umbilical hernia. A similar observation was made in the case of an old woman who was given the injections, in the first place, to obtain their tonic effect.

[Since most cases of hernia in infants are cured by a truss or bandage, it is much more reasonable to believe the cures in these cases were due to the bandages instead of the injections.—B. and C.]

The technique of the injection treatment employed by W. H. Walling, of Philadelphia, ¹⁹_{Sept. 22, '94} is outlined by him as follows: Place the patient on the operating-table; reduce the protrusion, if out; wash the parts well with some antiseptic solution; invaginate the scrotum with the index finger and locate the external ring; inject into the skin at this point 5 or more minims (0.33 cubic centimetre or more) of a 5-per-cent. solution of cocaine to which has been added 1 drop of a 1-per-cent. solution of nitroglycerin. Have the hernial syringe (specially devised by the author) filled with fluid; displace the air; wipe off the drop of fluid appearing at the end of the needle, and carefully note how far the cannula must be turned off in order to entirely cover the point of the needle. Allow three minutes for the cocaine to act, and then thrust the instrument through the skin and fascia at the point of the cocaine injection. Push it well into the external ring, carefully avoiding the cord. Change the instrument to the other hand and again invaginate the scrotum, being sure that the needle has entered the ring. Screw down the cannula until it covers the point of the needle, and, dipping down with the instrument, pass the cannula, by gentle manipulation, up the canal to the inner ring, bearing in mind that the inguinal canal is from one and a half to two inches in length, nearly parallel with Poupart's ligament, and about one-half inch above it. Having reached the inner ring, slowly inject from 3 to 5 minims (0.20 to 0.33 cubic centimetre) of fluid, 1 minim at a time; wait one or two minutes, slightly withdraw the piston of the syringe in order to empty the needle, and withdraw the instrument. Gently massage the parts to distribute the fluid evenly, and cover the puncture with antiseptic collodion. By lying quietly for a few moments the burning or smarting experienced will pass off, though it may return for a short time when the truss is adjusted, which must be done before the patient rises from the table. He must take the truss off only at night after lying down and put it on before arising. Repeat the operation every five or seven days, according to the amount of fluid used and the degree of reaction. A certain amount of healthy inflammation must be set up and maintained for a sufficient time, in order to effect a cure.

From six to twelve injections usually suffice. The older the patient, the longer the time required. A well-fitting truss must be adjusted and worn a few days before beginning the treatment in order to see if it keep the hernia well reduced, and it should be worn from three to six months after treatment has ceased. Composition of fluid used is as follows: Complex salts of aldehyde, 30 per cent.; iodo-ethylate of guaiacol, 30 per cent.;

sulphotannate of zinc, 20 per cent.; free guaiacol, 5 per cent.; beech-wood creasote, 15 per cent. Do not allow water to come in contact with the fluid, as water decomposes it.

Walling states, in another article, ^{Jan. 19, '95} that, in an ordinary case, one week after the sixth injection has been properly made the patient may stand, the truss be removed, and the parts carefully examined. The patient may give a slight cough, which will give an impulse differing in character upon the two sides if there is still a hernia. With the finger these impulses may be readily differentiated after a little practice. If the hernia seem to be well, another examination should be made in two weeks, the truss being worn as usual.

In one month after the last injection it can be ascertained whether further treatment is necessary. There may be a weak point that needs re-enforcing. The patient should be kept under observation for at least six months, with monthly inspections, and not be allowed to put undue strain upon the parts until they are thoroughly healed.

The operation for femoral hernia is practically the same as for the inguinal variety, the protrusion being reduced and the canal followed up with the trocar and cannula-needle, obliterating it by producing the proper amount of adhesive inflammation. The object aimed at is to close up the opening by which the bowel leaves the abdomen, whether this be femoral, inguinal, or umbilical. For these operations only a suitable trocar and cannula-needle and a proper fluid should be used. Safety and success depend absolutely upon these two requisites. The skill to use them is readily acquired.

The injection method has established a permanent position in the treatment of reducible hernia, and the percentage of cures is greater than by operative procedure if proper instruments and fluid be used.

[There is no reliable evidence to prove that "the percentage of cures is greater than by operative procedure," and, in fact, the writer presents no evidence that permanent cure has resulted in any case. With the mortality of the radical operation reduced to almost *nil*, and with definite results known, operative methods will continue to be advocated in preference to all injection methods. —B. and C.]

Inguinal Hernia.

At the Middlesex Hospital Leopold Hudson ^{Oct. 3, '95} recently operated upon a case of right inguinal hernia in a female infant, 9 months old, in which the hernial sac was found to contain the

uterus, both Fallopian tubes and ovaries, and a knuckle of intestine.

A case of inguino-labial hernia, with ovary, Fallopian tube, and cornu of the uterus in the sac, was seen by G. W. Perkins, of Ogden, Utah. ⁹⁶
June, '95

Reymond ⁷
Nor., Dec., '94 reported a case of inguinal hernia containing the bladder, ovary, and Fallopian tube.

A case of obstruction of the bowels caused by incompletely reduced left inguinal hernia was treated by W. C. E. Taylor. ²
Dec. 15, '94

Umbilical Hernia.

According to Jules Bœckel, of Strassburg, ¹⁶⁸
Aug. 1, '95 umbilical hernia in adults which exposes patients to grave complications should be treated by radical cure (1) when it is irreducible, on account of strangulation or adhesions; (2) when it is incoercible, though reducible, and therefore shows a tendency to increase, and (3) when it is painful. If a hernia is small, recent, and easily reducible, it should first be treated by a truss, though too much reliance cannot be placed on this measure. If the hernia is large, no matter of how long standing nor how old the patient may be, radical cure should be proposed. Naturally, the older the patient, the graver the prognosis will be. The only contra-indication to the operation is a bad general condition due to diseases such as phthisis, pulmonary emphysema, diabetes, albuminuria, etc. Radical cure is indicated in children (1) when trusses have failed, (2) when the hernia tends to increase in size, and (3) when it is irreducible and causes functional disturbances. Finally, in umbilical hernia of the newborn, of large size, radical cure is called for (1) when the hernial coats threaten to rupture or become gangrenous, (2) when the hernia is partially or wholly irreducible, and (3) when, though reducible, it cannot be kept in place by a truss.

The operative technique is as follows: (1) incision of the skin (elliptical cutaneous resection of the umbilicus) and opening of the sac; (2) treatment of the omentum, which must be freed, resected, and reduced; (3) reduction of the intestine, if necessary; (4) treatment of the sac by occlusion by chain of sutures, resection, and reduction; (5) treatment of the fibrous orifice by freshening and suture; (6) suture of wound: (*a*) peritoneal, (*b*) fibro-muscular, and (*c*) cutaneous,—the first two sutures of silk or catgut and the third of Florence hair, and (7) antiseptic dressing. A pad to be worn after recovery.

By this plan radical cure of umbilical hernia has furnished 265 cures and 35 deaths in 300 cases,—a mortality of 11.7 per

cent. Operation for strangulated hernia has given 73 cures and 32 deaths in 105 cases, or 30.5 per cent. mortality. In non-strangulated cases it has given 3 deaths in 195 operations, or 1.5 per cent. mortality.

J. P. Warbasse, of Brooklyn, ¹⁵⁷_{Oct., '94} states that the umbilical hernia of infants occurs through the umbilical opening and is anatomically and clinically different from that of adults, where it occurs between the fibres of the linea alba in the immediate neighborhood of the old omphalic ring. The variety of umbilical hernia which becomes strangulated is that which is acquired, usually late in life. A peculiar feature is the extreme thinness of the sac. The symptoms are the same as in strangulated hernia of other varieties, except that they are apt to be more acute. The ring causes a tighter and more inelastic constriction; and the author is of the opinion that this tightness is the cause of the great mortality, which is out of proportion to that in other cases of hernia. When the strangulation is so tight and inelastic as is the case with umbilical ruptures, the vitality of the gut suffers much greater damage in a few hours of strangulation than it does from a much longer period when the constriction is more yielding and elastic. If to this be superadded the repeated traumatism of taxis, the condition is greatly aggravated.

[We do not believe that this difference exists in the majority of umbilical herniæ in adults. The greatest factor in producing the higher mortality in strangulated umbilical herniæ is the fact that in these cases the hernia is usually very large and complicated with numerous adhesions. The patients themselves are usually very poor subjects for operation.—B. and C.]

W. B. Coley ⁹⁶_{Aug., '95} presented a child to the New York Surgical Society who had had a large congenital hernia of the umbilical cord. At birth there was an umbilical hernia the size of a quart measure. Under mechanical treatment by strapping with adhesive plaster and bandage the tumor had been reduced to small size. Hernia of the cord is very rare and the prognosis not favorable.

The treatment of umbilical hernia in children is discussed by Cahir, ⁹¹_{Apr., '95}; ²_{May 18, '95} who states that operative treatment by one of the numerous modern methods is indicated in the following cases: 1. When an umbilical hernia in an infant causes symptoms of strangulation or is associated with persistent gastro-intestinal troubles which cannot be attributed to any other cause. 2. Also in young subjects from 2 to 7 years of age in whom like symptoms are caused by umbilical hernia. 3. In children from 2 to 7 years of age, suffering from umbilical hernia, who, in consequence of defective means of retention or of careless treatment, remain with

the hernia in much the same condition after the use of pad and bandage continued for twelve or eighteen months. 4. In children over 7 years of age suffering from unmanageable or irreducible hernia presenting a tendency to increase in size. 5. When the skin over the hernial swelling is ulcerated and inflamed. 6. When the existence of an umbilical hernia is likely to interfere with the patient's career in any special calling. 7. When the hernial ring is large. 8. When the patient is subject to strangulation or to inflammatory attacks. 9. When the hernia, by exciting pain and gastro-intestinal disturbances, seriously impairs the development of the young subject.

[Most cases of umbilical hernia in children are cured before puberty, and operation is but very seldom indicated.—B. and C.]

A case of umbilical hernia in a child, 15 months old, was treated by radical cure by Edmund Owen, of London, ⁶Nov. 16, '94 who states that on seeing an umbilical hernia the first thing to be done is to find out why the protrusion has occurred. It may be that it was acquired because the infant had been perpetually straining with vomiting, in which case, if a flat pad is strapped over the aperture and the food and feeding are properly regulated, a cure may be gradually effected. Sometimes, again, the hernia is caused by straining set up by a tight foreskin, by diarrhœa, constipation, a rectal polypus, or by whooping-cough. In such cases a radical operation is obviously out of the question. Then, again, in the rickety child, when the bowels are distended by the accumulation of gases and the linea alba is frayed out and the interval between the recti abdominis is widened, the umbilical scar must needs be weakened and the occurrence of an exomphalos is invited. In these circumstances the administration of repeated doses of rhubarb and soda, together with careful dieting and supervision, may effect all that is needed. But, when the causes of the rupture are obscure, when no clear "indications" for treatment are discoverable, and when the abdominal aperture is large and the flat pad and strapping have failed, a radical operation is not only justifiable, but necessary.

In the case reported by him chloroform was administered and an operation performed as follows: The bowel having been returned, an incision was made skirting the base of the tumor down to the peritoneum. The peritoneum was then cut off flush with the front of the abdomen, integuments and sac being taken away together. The circular opening in the peritoneum was then sewn up, and the edges of the skin wound were approximated by stitches which, inserted wide of the cut surface, traversed the fibrous walls of the abdomen and made all secure. A week later the dressings

were changed, the wound being soundly healed and giving no impulse on the patient crying. In three weeks the child was taken home, to all appearances perfectly cured.

A fatal case of inflamed and irreducible omphalocele was operated on by d'Arcy Power, of Chelsea, ^{Nov. 24, '94} who states that it is the second case of the kind which has come under his notice, the first one also proving fatal. There is no more reason why these cases should be hopeless than an ordinary case of strangulated inguinal hernia, for the same treatment is applicable to both forms of rupture. There seems to be a prejudice against making any attempt at taxis in congenital umbilical hernia, though there is no doubt that if it be applied early the gut can in many cases be put into the abdominal cavity. If taxis be delayed, on the other hand, the slight inflammation attending the separation of the umbilical cord becomes greatly exaggerated, involves the sac with its contents, and soon spreads to the peritoneum. It is then too late to do anything, and the child dies. Early taxis is called for in these cases, and the greatest care should be taken to prevent the cord becoming septic during the process of its separation. The surgeon should perform an abdominal section as soon as he has satisfied himself that taxis is useless, and he should remember that every minute he delays jeopardizes a successful result, for the inflammatory processes in young children are very rapid.

The results now obtained, under favorable conditions, by operation for the radical cure of umbilical hernia are well illustrated by five cases under the care of Frederick Page, of London. ^{Sept. 28, '95} It is possibly too early at present to speak of the cures as radical ones,—time only will prove this; but the immense relief afforded to the patients for the time must be apparent to all readers. To operate on a case of strangulated umbilical hernia in a typical patient is a great tax on the skill and resource of any surgeon, and the difficulties such cases present are only appreciated by the experienced hospital surgeon. The patient is usually a bad subject for any operation,—a big, fat woman of low vitality, suffering from chronic bronchitis and a weak heart, often a victim of chronic alcoholism, and exhausted with vomiting, pain, and loss of sleep. The hernia is usually large, with contents frequently firmly adherent to the thin sac and each other, and demands care and much patience in handling; so that the operation is of considerable duration. The mere administration of an anæsthetic to such people is fraught with danger, and when continued for an hour, or even two, adds greatly to the chances which militate against successful operation. Page is strongly of opinion that in most of the cases of umbilical hernia it would be far better for the

patients to undergo operation in the early stage of the condition than to run all the risks and discomforts of the mechanical treatment, with the occasional attacks of pain, obstruction, or incarceration to which they are liable. There are also always staring them in the face the risk of strangulation and the possibility of the need of an operation under unfavorable circumstances. In closing the opening in the linea alba in old-standing cases it is much more difficult to bring the edges together and keep them there than it is in the more recent ones; therefore the relapses after operation for strangulation will, in proportion, probably prove more frequent in this variety than in other forms of hernia or than will be the case after early operation for radical cure.

In umbilical, as in other forms of hernia, the main objects of radical cure are, according to Lucas-Championnière,⁹¹ Nov., '94; Jan. 12, '96 to remove the sac and to secure its pedicle, and to close the orifice in the abdominal wall by sutures arranged in rows so as to establish a firm cicatrix. In most cases in which the sac is removed it is necessary to excise the umbilicus. In operating on umbilical hernia the author follows his usual custom in practicing radical cure of removing large masses of omentum, and thus, by reducing the tension of the abdominal wall, lessens the risk of relapse. The opening into the peritoneal cavity is closed by five rows of sutures,—one for the peritoneum, one for the skin, and three for the different muscular layers. In cases of small, umbilical hernia this operation, it is stated, has had excellent results. In large swellings, however, there is a constant tendency to relapse. The secret of the successful surgical treatment of umbilical hernia is never to allow the swelling to attain a large size. The extreme gravity of a large umbilical hernia with regard to the general health of the subject, the especial danger attending its strangulation, and the inevitable enlargement of the swelling should lead surgeons to propose an operation with a view to radical cure in every instance in which the swelling is still small and in an early stage. The author has operated on eighteen cases of umbilical hernia with good results, but in some of the more severe instances he had to contend with serious symptoms of pulmonary congestion.

In radical cure by Quénu's method, as described by Roger,²⁰⁰⁰_{'95} the aim is to restore as much as possible the fibrous layers of the linea alba after reduction of the contents and resection of the hernial sac. This aim is accomplished by moving toward the median line and suturing a certain number of fibrous and muscular strata, obtaining a superposition of the following sutures: (1) suture of the peritoneum; (2) suture of the posterior lip of the

sheath of the rectus; (3) suture of the two bodies of the rectus; (4) suture of the two anterior lips to their sheath, and (5) suture of the skin with Florence-hair sutures. This procedure, according to the author, is superior to omphalectomy, being less severe and at the same time possessing the advantage of rendering the wall solid.

Howard Marsh⁶_{Oct. 27, '94} removed the sac of an umbilical hernia in a woman of 45 years, the hernia having been irreducible for twelve months and having existed for fourteen years. Obstruction had been complete for three days. The recovery of the patient, in

the opinion of the surgeon, was mainly due to the fact that the muscular wall of the colon had, in consequence of repeated obstruction, become greatly hypertrophied. In this condition it was very vascular and strong, and, although it had been subjected to a week's partial and three days' complete strangulation, it was so little injured that it was able at once, when returned into the abdomen, to resume its peristaltic action and transmit its contents. This element of hypertrophy, in whatever degree it is developed, is an evident advantage not only as conferring

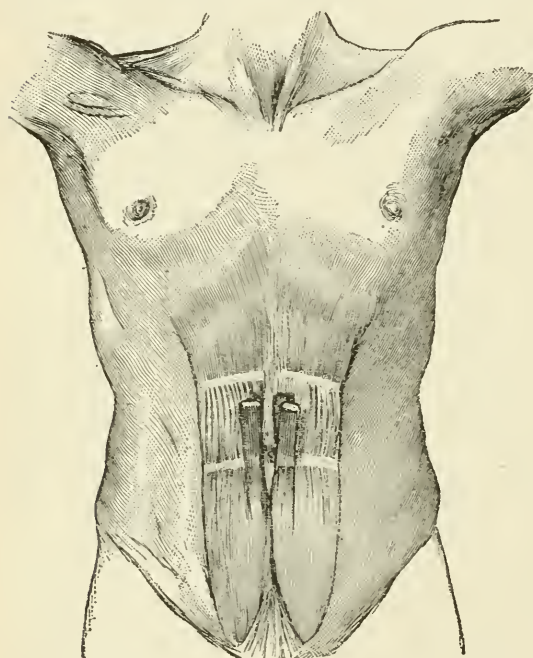


FIG. 1.

OPERATION FOR UMBILICAL HERNIA. (DAURIAC.)

La Semaine Médicale.

an increased power of resistance to injury in the intestine, but also in regard to operative treatment. It facilitates the introduction of sutures and it promotes vigorous healing and the speedy resumption of peristaltic action.

Tillaux, of Paris,³_{Mar. 6, '95}⁵_{Aug.} describes a modification of the radical cure of umbilical hernia, devised by his assistant, Dauriac. The method consists in making two longitudinal incisions in the recti muscles in the middle third of their length, dividing them into two bands. The internal bands, including the anterior portion of their sheaths, are divided transversely at their superior

extremities, while the two external portions remain to preserve the continuity of the recti. After their detachment the two bands are much less retracted; this permits of their being crossed over the point where the umbilical opening formerly existed. Their superior extremities are thus transposed, each uniting with the rectus of the opposite side at the point where the other was removed. The accompanying cuts (Figs. 1, 2, and 3) illustrate the procedure.

[It may well be doubted if this elaborate procedure has any advantage over the simpler one of suture in three layers of peritoneum, fascia, and skin.—B. and C.]

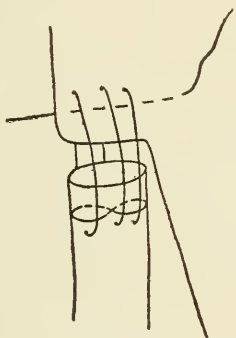


FIG. 2.

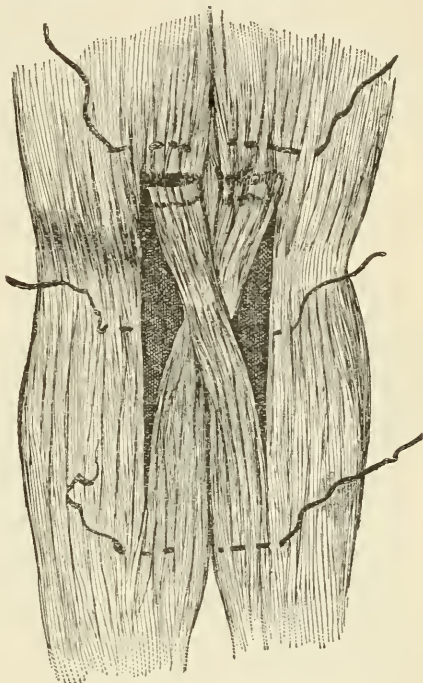


FIG. 3.

OPERATION FOR UMBILICAL HERNIA. (DAURIAC.)

La Semaine Médicale.

Ventral Hernia.

From observing 1000 cases of laparotomy done in the hospitals in Berlin, Winter ³ _{June 15, '95} ⁸¹⁴ _{Sept. 15} finds that nearly one-third of all the cases suffer from a ventral hernia. In some cases the hernia does not develop for one or two years after the operation. In Olshausen's clinic they find that the best results are obtained by suturing the abdominal walls by three tiers of sutures,—one for the peritoneum, one for the fascia, and one for the skin. Among 212 cases sutured by this method only 12 have hernia. It is always well to have the patient wear an abdominal bandage after the operation.

Stephen Paget ² _{Oct. 20, '94} reported to the Pathological Society of London a case of strangulated ventral hernia in a woman, 50

years of age, who had been subject to attacks of pain in the left iliac region, these recurring latterly once a week; they began suddenly without known cause and were followed by some obstruction and vomiting; a swelling existed in the region mentioned. The patient was admitted into the West London Hospital with acute obstruction, which was succeeded by fecal vomiting. On operation the tumor was found to be a strangulated hernia, of which the neck lay two and one-half inches above Poupart's ligament, the sac being outside the rectus muscle. The hernia dated from a severe labor. The intestine was easily reduced, but as it was gangrenous an artificial anus was made, though without a successful issue.

Niechues ⁴⁷⁵_{Feb., '96; Mar. 2} has collected 38 recent cases of hernia of the linea alba, 11 of which, treated by Kümmell, of Hamburg, are here recorded for the first time. This series of cases shows that the most frequent situation of hernia in the middle line of the abdominal wall is not near the ensiform process, but within an inch of the upper margin of the umbilicus. This form of rupture often follows violent muscular exertion and blows on the front of the abdomen, and occasionally rapid emaciation. In several of the cases published in this paper no distinct sac could be found at the time of operation for radical cure. Almost every patient belonged to the working classes, and of the whole number 30 were males and 8 females. In most instances hernia of the linea alba, even when it consists merely of a small protrusion of subperitoneal fat, causes pain, vomiting, colic, and other severe symptoms out of all proportion to the extent and nature of the lesion. The condition of the patient often becomes very distressing, as acute pain is usually brought on by very slight muscular exertion and after taking food. In some few cases those symptoms may be removed or much alleviated by the wearing of a closely-fitting vest or girdle. The use of any kind of truss supplied with a pad is to be avoided, as pressure directly applied to the seat of rupture is liable to dilate the abnormal opening in the abdominal wall, and to cause adhesive inflammation of the hernial contents. In most instances, and especially in those in which the rupture is irreducible, an operation for radical cure is indicated. The protrusion having been freely exposed, any adhesions of intestine and omentum to each other and to the neck of the sac or the margin of the ring should be carefully separated. The protruded omentum should be ligatured and removed and the intestine carefully replaced in the abdominal cavity. Finally, the margin of the ring should be excised and the raw edges be brought together by sutures. If the hernia consist only of a protrusion of subperitoneal fat, this should be cut away.

The result of this operation is, as a rule, very striking and the painful symptoms cease immediately.

A case of ventral hernia with strangulation of omentum is described by E. E. Montgomery, of Philadelphia. ¹⁹
Mar. 2, '96

Femoral Hernia.

W. B. de Garmo, of New York, ⁴⁶²
Sept. 7, '95 remarks upon the rarity of femoral hernia in children. In an experience of twenty years he has never seen a case in a child under 8 years, and very rarely under 14 years. The three varieties most frequently met with are inguinal, umbilical, and ventral, and these in the order named.

[Several cases of femoral hernia in children under 8 years have been operated on at the Hospital for Ruptured and Crippled in New York.—B. and C.]

W. S. Weissinger, of Hernando, Miss., ¹
Oct. 6, '94 relates a case of strangulated femoral hernia in a single woman, aged 61 years, the chief features of interest in which are: the persistence of symptoms of strangulation for the unprecedented period of sixteen days and eighteen hours from the inception of the first symptoms of strangulation to the time of division of constriction, the persistence of stercoraceous vomiting for fifteen days, the non-retention of anything at all in the stomach, the complete inaction of the bowels during the whole period of illness, the marvelous escape of a portion of constricted bowel from death, the death of a portion of omentum, and, lastly, the final reaction, after operation, and marvelous restoration of a patient of such advanced age to her usual good health.

John B. Roberts ⁹⁶
July, '96 presented to the Philadelphia College of Physicians a cyst obtained from a case of femoral hernia, adding that, in several cases upon which he had operated for radical cure of femoral hernia, when he had cut down to the sac he had found a cyst containing fluid. It was curious as a natural truss filling the ring and extending into the femoral canal, preventing the descent of intestine. The cyst was movable, but could be pressed up against the ring.

Morton, in discussing the case, said that he had never seen such a cyst in these cases, but in a case operated upon by Hunt there was a cyst in which echinococcal hooklets were found in the fluid. The hernial sac seems a favorite place for the development of the echinococcus.

[This case was probably a simple "hydrocele of a hernial sac." A similar case was operated upon at the New York Hospital by W. T. Bull.—B. and C.]

Strangulated Hernia.

General.—As to the condition of the bowel and contents of the sac in strangulated hernia, Tietze, ²²⁶_{B. 49, H. 1}; ²¹³_{Feb., '95} from observations in Mickulicz's clinic and from experiments on animals, reports as follows: 1. Bacteria may be present in the fluid at a time before structural alterations have occurred in the bowel-wall where, at all events, clinically, the bowel would be spoken of as above suspicion. 2. But this condition is not constant, and the bacteria are not present in such numbers as to modify our treatment. Clinically the fluid is to be regarded as sterile at this stage. 3. Not even in every case of gangrene of the bowel does the fluid contain living organisms capable of development. 4. Against certain forms of bacteria the fluid of the sac, both in man and other animals, possesses a destructive influence.

Of the many varieties of strangulation by peritoneal bands, that by a knot is the rarest form. A case observed by Commandeur, of Lyons, ⁷³_{Jan. 12, '95} is doubly interesting.—first, from an anatomical stand-point, and, second, as an argument in favor of evisceration and open, methodical search for the cause of strangulation in cases of internal strangulation. The author concludes that fibrous peritoneal bands frequently form after operations in the lesser pelvis, and that these may sooner or later lead to internal strangulation. As these bands may be numerous, the abdomen should not be closed after one of them has been found, in operating, but a careful examination of the intestine should be made to see if there are no others, the examination being made “*à ciel ouvert*,”—the only method permitting a complete search.

J. R. Johns, of Denver, Pa., ⁹_{Jan. 19, '95} reports a successful intestinal anastomosis after the loss of thirty inches of small intestine from twisting in a hernial sac.

Finkelstein, ¹⁶⁸_{Mar. 1, '95}; ¹¹⁹_{July 18} in treating cases by the application of ether, places the patient in the horizontal position, with the pelvis raised and the thighs and legs flexed. After anointing the crural region, the folds of the groin, and surrounding part with some lubricant, as olive-oil, 1 or 2 fluidounces of ether are sprayed upon the tumor. In from three-fourths of an hour to three hours the tumor will have lost a little of its volume, as well as its tension. If the hernia now is not reduced spontaneously, slight taxis will bring about a reduction with surprising rapidity. Gussenbauer, who has practiced this method for over two years, has had twenty successes in twenty-five attempts.

Gussenbauer, of Prague, ⁸⁸_{No. 46, '94} believes that, though the above method may be efficacious, it is only applicable in country practice and at the beginning of strangulation, when it is impossible to

operate. It would be unjust to the patient to delay operation whenever possible, and thus cause him to lose the benefits of surgical intervention, which removes the strangulation, recurrence being prevented by operation for radical cure.

E. Becker³⁰¹_{Sept., '94} publishes the statistics of resections of the intestine practiced during a period of ten years at the clinic of Trendelenburg, of Bonn. The total number of 33 consists of 5 cases of strangulated hernia, 11 of artificial anus following strangulated hernia, 2 of ileus, 1 of appendicitis, 4 of stercoral fistula consequent upon perityphlitis, 1 of stercoral fistula following rupture of the colon, 3 of cicatricial contraction after tuberculosis, and 6 of tumors. The 33 operations resulted in 21 recoveries. From these statistics it appears that the establishment of an artificial anus gives better results than intestinal resection in the treatment of strangulated and sphacelated hernia. Therefore at the Bonn Clinic it has been the rule in such cases to first create an artificial anus and afterward, if necessary, to resort to intestinal resection.

E. Evans, of La Crosse, Wis.,⁵¹_{Sept., '94} operated on a child, 18 days old, for strangulated hernia fifty-seven hours after the onset of symptoms of strangulation. The infant made a rapid and uneventful recovery.

Ch. Villems¹⁰⁷⁷_{June 15, '95} reported 32 cases of strangulated hernia with operation,—24 recoveries and 8 deaths. The mortality depended on the incurable nature of the cases, the abuse of taxis, and delay in operating. He believes that after thirty-six hours of strangulation taxis should not be attempted, but operation performed without delay. Cases in which the diagnosis is doubtful should be regarded and treated as strangulated when tender and sensitive to pressure and when suddenly becoming irreducible. To avoid error, the canal should be incised its whole length and the fibrous band freely exposed. In cases in which gangrene of the small intestine has occurred or is imminent, enterectomy followed by enterorrhaphy must be considered the method of choice.

[Enterectomy should depend on the condition of the patient and the skill of the surgeon.—B. and C.]

Stephen Paget¹⁰⁷⁷_{Oct. 10, '94} operated on a child, 3½ months old, for strangulated hernia. He noticed, during the operation, what is sometimes found useful in dealing with such cases, that the bowel would not go back until the child was held up by the heels, when it became reduced in a moment. A week later the wound gave way in its entire length, and the same incident occurred a second time, the wound healing finally by the thirty-fifth day.

Since 1879 some 106 patients with strangulated hernia have

come under the care of G. A. Wright, of Manchester. ⁹⁰_{Aug., '95} Of the 106 patients 31 died,—a mortality which, as matters stand, is probably not above the average, but the author has no hesitation in saying that such a death-rate might and ought to be reduced by 50 or 75 per cent. If hernial patients were operated upon at once, instead of putting off the only certain mode of relief till exhaustion, gangrene, paralysis of the bowel with septic absorption, or peritonitis make operation too late, the mortality would fall to small proportions. If in addition to early operation the practice of taxis were abolished, the mortality of strangulated hernia would be nominal and very few patients would die except those whose age or degeneration of tissue rendered them incapable of bearing even a trivial injury or tolerating confinement to bed. Given a patient whose hernia has suddenly become irreducible, with pain in the hernia or at the umbilicus and vomiting or nausea, Wright would at once give chloroform, and, if a momentary gentle squeeze did not reduce the previously reducible gut, he would operate. All other symptoms are outweighed in importance by three,—a sudden appearance or sudden increase in the size of a hernia; pain, either in the hernia or about the umbilicus, and nausea.

V. Razoumowski ⁵⁸⁶_{May 25, '95} reports a case of primary resection of the intestine for strangulated hernia, with lateral anastomosis by means of plaques of potato. The patient, who was insane and 35 years of age, made an excellent recovery. The method of using vegetable plates, as is known, was presented almost simultaneously by Dawbarn, of New York, and R. Baracz, of Krakow, in 1894. The author has collected 26 cases in which the method was used, with 7 deaths,—a mortality of 27 per cent.

Fikri, of Constantinople, ²³²_{Nov. 30, '94} observed a case of strangulated hernia following a slight blow from a steel chain. Herniotomy was performed, and the circulation in the strangulated loop became re-established, although it had presented an almost gangrenous appearance.

Abbe ⁹⁶_{Oct., '95} reports a case of strangulated hernia, with resection and anastomosis with Murphy's button, in which death occurred from kinking and strangulation due to the weight of the button.

F. J. Lambkin, of Newcastle, Jamaica, ²_{Sept. 14, '95} reports a case of strangulated hernia in an infant 16 days old. He found that the gut was very tightly constricted by the outer pillar of the inner ring. It was with the greatest possible difficulty that he introduced the hernial knife beneath the constriction. The bowel had a suspicious look, but was returned. During the operation he had some difficulty owing to hæmorrhage. After the operation there was great shock and the child became almost moribund on the

table. Breathing at one time ceased, and he employed artificial respiration for twenty minutes. After a time the patient rallied and finally recovered. The author does not doubt that the rupture was present at birth, but that it went unnoticed until it became strangulated. It is a remarkable case, owing to the tender age of the little patient, the rapid development, stercoraceous vomiting setting in very early and the gut having a suspicious look, although constricted for so short a time. The latter shows all the more the danger of delay in operating, even if it be only for a few hours.

An unusual form of strangulated hernia was seen by Donald F. Shearer, of Norwood, S. E. ^{June 15, '96} It was not possible to reduce it, and he left it under an ice-bag for twelve hours, when he cut down on the sac and found that it was full of clear fluid with a knuckle or two of gut protruding through the internal ring into a dilated canal of Nuck. The gut, which was dark red and congested, was easily returned when the pressure of the fluid was removed, without incising the neck of the sac. The cause of the strangulation was then obvious. The internal ring had, by repeated descent of the hernia, been invaginated into a distended sac to the extent of nearly an inch, causing a circular depression around and above it, into which the prolapsed intestine had been forced and was subsequently compressed and strangulated by the increasing fluid. The sac was removed and the neck ligatured as high as possible. The patient recovered satisfactorily.

[Strangulation is not produced by increase of fluid in the sac.—B. and C.]

John A. Wyeth ^{Mar., '96} reports a case of strangulated oblique inguinal hernia of the right side, in a child $2\frac{1}{2}$ years of age, with the bladder imprisoned in the hernial sac and inguinal canal. As the child was in a very weak condition at this time, the radical operation for the cure of the hernia was not deemed expedient. The wound was filled with an iodoform-gauze compress and left to heal by granulation. For the first five days after the operation a small catheter was kept in the bladder, being introduced through the urethra. This precaution was taken in order to prevent the bladder being filled with urine and leakage at the point of suture. The patient recovered without any accident.

In a case of inguinal hernia Owen ^{May 29, '96} opened the abdomen in the middle line rather than in the inguinal region. He then found a coil of small intestine strangulated in the sac and thrust into the pelvis. Having eased the strangulation with a hernial knife, he withdrew a coil of gangrenous bowel. This he resected, "marrying" the ends of the bowel with Murphy's button. He

remarked that this was the fourth time this year in which in urgent and almost hopeless cases he had employed the button, and, though he had hitherto met with no success, he was strongly of opinion that Murphy's invention was of the greatest possible value in practical surgery.

[In the majority of cases of gangrenous hernia, unless the patient is in exceptionally good condition and the surgeon is familiar with the technique of resection, the better policy is to form an artificial anus.—B. and C.]

Gilbert Barling, of London, ⁶_{Mar. 9, '95} used Murphy's button in a case of umbilical hernia. Strangulation was by a severely constricting band, which involved about five inches of small intestine, and the upper, or entering, portion was gangrenous at the point of constriction. The patient's general condition being good, the strangulated gut, with a V-shaped piece of mesentery, was removed, and the divided ends of the intestine approximated by a Murphy button one inch in diameter. Recovery was uneventful, but the button was not passed until the twenty-fourth day,—two days after the patient had been allowed to get up. It gripped a ring of necrosed gut.

In a case of strangulated umbilical hernia treated by Stuart McGuire, of Richmond, ⁸¹_{June, '95} the ring was incised above and below and the contents drawn out for inspection. About sixteen inches of the gut were found gangrenous; it was resected and a V-shaped piece of its mesentery excised. The patient suffered no pain and had no rise of temperature. Her bowels moved on the third day. The wound healed by primary intention and the stitches were removed on the eighth day. The button was found in the rectum on the twentieth day, and had to be extracted with a pair of forceps. She was discharged from the hospital, cured, at the end of the third week.

J. Ward, of Ophir, N. Z., ²⁶⁷_{Dec. 15, '94} treated a case of strangulated inguinal hernia by means of aspiration. In the hut in which the man lived alone there was no suitable convenience for a warm bath, and any attempt at serious operative measures would have been extremely risky, for obvious reasons. Ward therefore decided to aspirate the hernial swelling with the hypodermatic needle, which was at hand, and, after introducing the needle well into the gut, succeeded in drawing off a considerable quantity of a pinkish, flaky fluid, with a faint, sickening odor. A fourth aspiration reduced the swelling very materially, but Ward scarcely felt sure that the gut had returned into the abdominal cavity, as the thickened walls of the sac gave more grounds for distrust. He therefore had the foot of the bedstead elevated. Fortunately the vom-

iting ceased and the bowels were relieved during the night, proving that the measures taken had been successful.

[Aspiration has been successfully employed in a considerable number of cases of strangulated hernia, but it should only be employed when operation has been refused.—B. and C.]

Guérin ²⁴³_{No. 4, '95} prescribes coffee in strangulated hernia and intestinal occlusion. An infusion of 250 grammes of coffee to 12 cups of boiling water, 8 cups being given at quarter-hour intervals and the last four cups at half-hour intervals. Reduction must not be expected within four hours. If the coffee is not tolerated by the stomach, it can be given by rectal injection, or caffeine may be given by subcutaneous injection, the first dose being 0.50 gramme, increasing rapidly to 1.50 or even 2 grammes if the remedy is well borne.

Debersaques, of Ghent, ⁶⁸⁴_{Aug., '95} found that spontaneous reduction followed the use of hot fomentations in a case of strangulated crural hernia with dangerous symptoms, in a woman who had refused operation. The author thinks that the plan is worthy a trial in a similar case, being less dangerous than taxis.

Taxis.—According to Henry E. Stafford, of Salinas, Cal., ⁷⁷_{July, '95} strangulated scrotal hernia that resists taxis can be reduced oftentimes with the rubber bandage. The bandage is wound around the scrotum and penis together and the equable pressure empties the engorged vessels of the prolapsed intestine and in due time it slips back without difficulty.

[We do not believe this procedure one to be generally recommended.—B. and C.]

G. M. Wells, of Portland, reported to the Oregon State Medical Society ¹_{Nov. 2, '95} two cases illustrating the practicability of combined, or rectal, taxis. The middle and index fingers of the right hand were passed up into the rectum, pushing toward the internal ring, and by pressure on the abdomen over the ring with the left hand and making gentle manipulation the protruding gut perceptibly gurgled and in a few moments was reduced.

In the discussion Cauthorn stated that he had made some investigations to ascertain the exact distance of the anus from the internal ring; by pressing well up and making firm pressure from without he could bring the anus within three-fourths of an inch of the internal ring. He had been surprised to find such resiliency of the anus or rectum; it could be made to reach across the true pelvis.

Brown ⁹_{May 4, '95} ¹¹²_{July} gives the case of a child, aged 2 months, suffering from strangulated hernia in the right inguinal region. He attempted reduction by inversion of the child and taxis under

chloroform. Although this was continued for half an hour, it failed. The index finger of the right hand was then introduced into the rectum, and, while steady pressure was made on the mass from without with the left hand, with the finger in the bowel he pushed the portion of the mass presenting through the abdominal opening from side to side in every direction.

By this means the mass was finally moved slowly back through the opening and finally dropped into the abdomen. The tip of the finger could then be inserted into the internal opening. He suggests that in adults, if the surgeon possess a small hand, it may be introduced into the rectum and traction made with the finger and thumb on that portion of the tumor just within the abdominal ring.

[We believe that the practice of taxis under an anæsthetic for half an hour to be very dangerous. Operation would have been attended with much less risk. We have seen one instance in a child in which death was caused by taxis less prolonged than in the above case.—B. and C.]

Charles F. Judson⁵¹_{Dec., '94; May, '95} reports a case of strangulated hernia in a male child 4 years old, occurring in the service of Samuel Ashhurst, at the Children's Hospital of Philadelphia. Two days before admission to the hospital he had become wedged between the seat and arms of a chair, and had to be extricated forcibly. Taxis and ice having failed, Ashhurst operated and readily reduced and returned the protruded gut. The peculiarity in the case was the absence of anything like a thick sac. The protrusion having been so recent, the hernia had only started down in the course of the cord, the outer and inner rings being distinctly recognizable and separated from each other about three-quarters of an inch.

[In most cases of hernia in infants and young children the sac is very thin, but it can always be recognized if a careful dissection is made.—B. and C.]

Diaphragmatic Hernia.

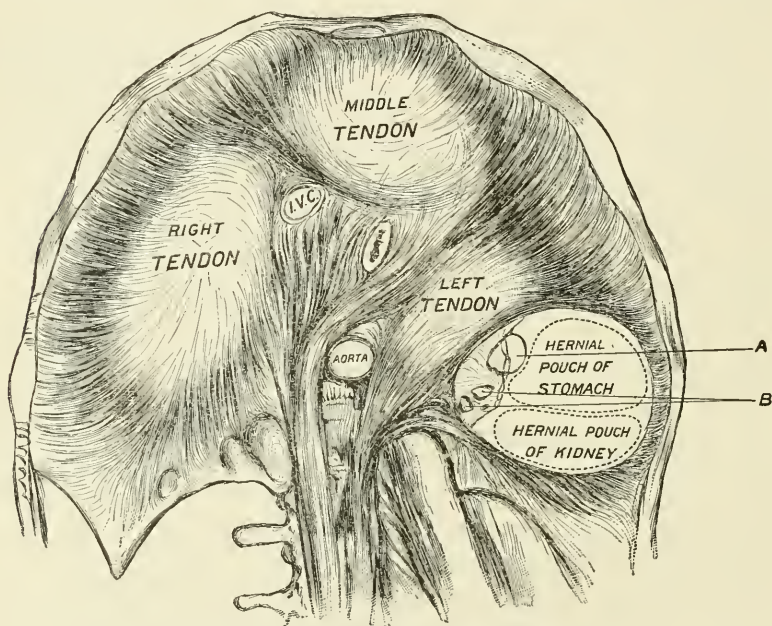
In connection with a case of strangulated diaphragmatic hernia, with necropsy, A. J. McClosky, of Singapore,⁶_{May 4, '95} remarks that patients who are suffering from a diaphragmatic or phrenic hernia do not often reach adult age; the large majority of congenital herniæ of the kind described were found when necropsies were being made on children. The various ways in which they form are as follow: (1) as a consequence of weakening of the diaphragm in some part, permitting of the protrusion of some of the abdominal contents into the chest; (2) protrusion through a

congenital opening in the diaphragm; (3) through one of the natural apertures, and (4) through an opening which has formed as the immediate or remote result of a wound or laceration of muscle. The protrusion is usually on the left side of the body, the presence of the liver being sufficient, as a rule, to protect the right side. The signs presented on the side of the chest into which the hernia has escaped are much like those of pneumothorax and may be mistaken for it; sometimes there is dullness on percussion in consequence of effusion or the presence of some of the solid viscera.

In his case the herniated organs consisted of the stomach, the first part of the duodenum, omentum, spleen, and a few coils of the small intestine. The orifice was situated on the left side of the diaphragm close to its lateral, posterior attachments to the ligamenta arcuata; it was circular in shape, smooth-edged, and of such a size as to admit the passage of five fingers. McClosky is of opinion that the orifice in the diaphragm was a congenital malformation because of its situation, its smooth and even margin, its circular shape, absence of any adhesions, and absence of any history of injury or signs of any fracture of ribs.

A case of congenital defect of the diaphragm with combined diaphragmatic hernia is described by F. Fry, of Montreal. ²⁸²_{Aug., '96} Thirty-six hours after admission the patient died cyanotic, with extreme paroxysms of dyspnoea. Upon removal of the left lung a large mass of omental tissue, a portion of the stomach, and part of the left kidney were found projected upward into the thoracic cavity. This being the case, the diaphragm was carefully removed in its entirety, with all the organs in connection with the hernia. Previous to its removal the fact that the kidney was so high up led to an examination of the extent of the motility of the organ, and it was found that the kidney could be moved easily as far upward as the fourth rib, while there was an equally free motion downward. On spreading out the diaphragm it was of relatively great size in circumference and very muscular, save in the hinder portion of the left side. The right and middle tendinous portions were of the usual relative dimensions, the middle being considerably smaller than the right. On the other hand, the left was no more than one-fourth the size of the middle tendinous portion. This made the muscle about the left border of the diaphragm appear unusually extensive. The right crus was readily made out and was stout and prominent, while the left was with difficulty isolated and was comparatively small and thin. Almost immediately behind and to the left of this left tendinous portion, separated from the edge of the latter by a muscular band

five millimetres in width and more prominent, thick, and bulky than the neighboring muscular tissue, lay the defective portion of the diaphragm. This may be considered as being composed of two portions,—namely, a free opening, or, more truly, openings, extending from the thoracic into the abdominal cavity, and a larger area of thinning of the diaphragmatic tissue. This thinning was so extreme that the wall here was represented purely as a layer of the fused serous coats of the two cavities, with no intervening muscle. This thinned tissue formed independent



CONGENITAL DEFECT OF DIAPHRAGM. (FRY.)

Diagrammatic representation of diaphragm seen from below, showing position and relative size of hernia. *A* large and *B* the small communications between thoracic and abdominal cavities. Over *A* and *B* is indicated the commencement of the omental overgrowth.

Montreal Medical Journal.

coverings over the portion of the stomach protruding as a hernia into the thoracic cavity and over the left kidney. The entire defective area measured seventy-nine by seventy-nine millimetres. It is evident, from this description, that, taking into account the age of the patient, the extent of the defect, the absence of symptoms, and the anatomy of the parts, the case is one of congenital defect of the diaphragm.

A case of diaphragmatic hernia reported by S. Chandler, of Wilmington, Del., ¹¹²Dec., '04 is interesting on account of the large extent of abdominal viscera in the thoracic cavity. Ten years previously

the man had fallen from a tree, injuring himself so severely that he had been confined to his bed for six weeks. The extent and location of injury could not be positively ascertained, but when he had started to walk he complained of a sharp pain, deep in the left hypochondriac region. This pain had continued more or less severe until the present attack, when it suddenly increased in severity, the symptoms becoming marked and causing death within twenty hours. At the post-mortem the kidneys were seen to be flat and flabby, but in the normal position; the liver was dragged to the centre of the abdomen, its borders being dark and congested; the spleen was congested and pressed upward and back; the œsophageal opening in the diaphragm was ruptured, admitting a ball one and a half inches in diameter, and through this opening protruded the stomach, all the small intestine at a point eight inches above the ileo-cæcal valve, and also that part of the large intestine included between the hepatic flexure at a point eight inches above the sigmoid flexure. The intestines were almost coal-black and were distended with gas.

Llobet⁹¹_{Mar., '95; May 4} reports a case of old diaphragmatic hernia treated with success by an extensive plastic operation on the side of the chest. The patient, a man aged 50, had in 1883 received a deep, punctured wound in the eighth intercostal space on the left side. This injury was followed, in the course of forty-eight hours, by the appearance of a small swelling, which increased in size when the patient coughed. At the end of twelve months it had become as large as a hen's egg, and subsequently, though not farther enlarging, it caused increasing pain and discomfort and much difficulty in breathing. When seen by the author the patient was in a fair state as to general health, but complained much of shortness of breath. The respiratory movements were less free than in the normal condition. Dullness and friction-sounds could be made out at the base of the left lung, and there was a dry, pleuritic cough. A large flap, including all the layers of the chest-wall, with portions of the seventh, eighth, and ninth ribs, was formed on the left side and turned upward so as to expose the interior of the left pleural cavity. It was then seen that the external tumor formed part of a large hernia containing omentum and a portion of the transverse colon. The protruded omentum and the hernial sac were resected and the opening in the diaphragm was closed by sutures applied both to peritoneum and muscle. The large flap of thoracic wall was then replaced, the detached portion of the ninth rib being fixed in its place by wire sutures and the soft structures by two rows of sutures,—one row for the muscular layer, the other for the skin. The hernial orifice

in the eighth intercostal space was closed by a catgut suture. Finally, the air in the pleural cavity, the pressure of which had caused complete collapse of the left lung, was removed by aspiration. The patient progressed favorably after this operation, and at the end of the third week was regarded as absolutely cured.

F. W. McRay, of Atlanta, ⁶¹_{Dec. 15, '94} read a paper on hernia of the diaphragm before the Southern Surgical and Gynæcological Association, describing an interesting case in which, without warning, he was forced to meet the emergency without time for research. Strangulation had occurred five days previously. Had an early diagnosis been made the strangulation could have been relieved and the patient's life prolonged. The opening in the diaphragm was accessible, and he believes it could have been closed with a fair chance of permanent recovery. The case serves to emphasize the necessity for early operation in all cases of acute obstruction of the bowels.

Clozier ¹⁴_{Dec. 19, '94} observed a case of diaphragmatic hernia in an infant dying two days after birth. There was a large opening in the left half of the diaphragm, the stomach was vertical and occupied the left half of the thorax, and a part of the liver, the transverse colon, and the small intestine had also passed into the thorax. The convex surface of the liver showed a furrow produced by the cutting-edge of the diaphragmatic opening. The heart was pushed back to the right, the base being parallel with the right nipple and the apex at the right border of the sternum.

G. G. Sears, of Boston, ⁹⁹_{Jan. 31, '95} observed a case of congenital diaphragmatic hernia in an apparently perfectly-formed, 7-pound boy. Immediately after birth it gave two or three short, sharp cries, and then, though it seemed to make every effort, it was unable to produce a sound. Respirations became gradually shorter and quicker, cyanosis deepened, and death resulted an hour later. The autopsy showed that the greater part of the small intestine, the stomach, and the spleen were in the thoracic cavity, into which they had passed through a hole occupying the greater part of the left side of the diaphragm.

Complications.

The great increase in the frequency of wounds of the bladder of late years is attributed by B. F. Curtis ⁹⁹_{June, '95; July} to the altered methods of operating for hernia. The attempt to effect a radical cure, now made in even primary operations, necessitates complete dissection of the neck of the sac in order to ligate it, and for this reason the bladder is more likely to be wounded. The tissues of the herniated portion of this organ become so attenuated

that its recognition is a matter of difficulty, even after it has been opened.

The bladder may be involved in hernia in at least three different ways. The most common is a prolapse of a portion which is entirely extra-peritoneal. Rarest of all is the true intra-peritoneal form, and, in the third and most dangerous, both the extra- and intra-peritoneal portions are involved, the intra-peritoneal forming a part of the wall of an accompanying hernial sac, usually lying posteriorly. It has been supposed that the bladder is very rarely present in femoral hernia, but in 55 cases collected by Curtis 10 are of the femoral variety and 45 inguinal, proving that femoral hernia involves the bladder in a larger proportion of cases than does inguinal. Vesical hernia is found usually in advanced years and in people with old herniæ. In 45 cases in which the age was known, nearly one-third were over 60 years of age and two-thirds were over 50 at the time of operation. This descent of the bladder is ascribed by Cloquet and Roser to the traction exerted by a mass of extra-peritoneal fat; it is probable, however, that the peritoneum of the hernial sac draws the organ out of the abdomen just as the cæcum or sigmoid flexure is often pulled down. In habitual constipation the rectum, being distended by fæces, would lift the bladder to the level of the hernial apertures and favor its prolapse.

The diagnosis of this condition is oftenest made during the operation, for it is only rarely that symptoms relating to the bladder are found. Physical examination seldom gives a clue to the condition, but it may do so by revealing a flat, doughy tumor, in which cases the bladder should be explored by a large, curved sound. During operation, one of the most constant indications of vesical prolapse is the presence of an unusual quantity of fat surrounding the hernia. The appearance of the bladder itself is very deceptive. The wall may be so attenuated that the muscle forms only a thin coating and is totally unrecognizable. In this collection of 55 cases the bladder has been recognized 23 times before being wounded; in 4 it was not seen until it was wounded; in 2 it was not seen at all during the operation; in 10 it was taken for the hernial sac, in 4 for a second hernial sac, in 5 for a tumor or cyst, in 3 for a thickened patch in the sac-wall, in 3 for pro-peritoneal fat, in 1 for degenerated omentum, and in 1 for a portion of the colon.

When the bladder has been recognized before being injured, it should be freed and reduced, the ring being closed as usual by sutures. In cases in which it is difficult to dissect the bladder from the surrounding parts it is wise to abstain from any attempt

at radical cure and leave the pouch *in situ*. If a distinct diverticulum is found, however, it is best to resect it, closing the opening in the bladder with sutures, rather than to return such a long pouch into the abdomen.

When the bladder has been wounded, there is a choice of three methods of treatment: The open method, which leads inevitably to the formation of a fistula; the ligature, which may be used to occlude the wound in cases of emergency, and the suture, which should be used if it is in any way possible. By this method, which gave such excellent results in a case of the author's, the sutures were placed very close together, ten or twelve to an inch, and in three layers. The stitches of the first tier were passed through everything except the mucous membrane, and they held the divided muscular layer firmly together. The second tier was passed like Lembert's sutures of the intestine, turning in the first set slightly, and a third set, not so closely placed, rolled in and brought into contact still broader surfaces.

Lane, of London, ²²_{Jan. 30, '95} operated on a patient for the radical cure of a large, irreducible, omental hernia. He found that a part of the bladder covered by peritoneum had extended for almost three-fourths of an inch along the posterior wall of the sac, and was so ill-defined that, unless an operator was on the look-out for such a condition, it might readily have been included in the ligature. That portion of the sigmoid flexure which is uncovered by peritoneum also formed a portion of the neck of the sac, but this was readily recognized.

A. G. Gerster, of New York, ⁹⁶_{June, '95} reported two cases of injury to the bladder during operations for hernia, both ending in recovery, and L. W. Hotchkiss, ⁹⁶_{June, '95} another ending fatally.

N. Ostermayer, ⁷⁶¹_{B. 39, H. 1, 2} in discussing injuries of the bladder occurring during herniotomy, states that, when the hernial sac has been opened, it is generally possible, by means of certain signs, to recognize or, at least, suspect the presence of the bladder. A valuable sign, and one rarely absent, is prevesical lipocoele. Having laid bare the hernial sac, a fatty mass of peculiar appearance is seen behind it, differing by its lemon-colored tint from the paler adipose tissue of the other parts of the body. Sometimes it is an homogeneous mass, of varying thickness, covering regularly the herniated portion of the bladder; sometimes, on the contrary, the fatty mass is seen in the form of distinct little islets. Hypertrophy of the prevesical adipose tissue not infrequently gives rise to lipomata, single or multiple, attached to the prolapsed bladder. No matter what the form of this fat, however, it is always enveloped in a thin membrane, usually transparent and simulating a

true hernial sac. Another point is that the lipoma is firmly adherent to the sac; so that, in dissecting the latter, there is danger of wounding the bladder, the wall of which is ordinarily thinned or atrophied. Sometimes, indeed, the bladder is immediately adherent to the sac, without any adipose tissue between. The lipocele, in a certain way, reveals the presence of the bladder, and should warn the operator that great prudence is necessary in the dissection of the sac. He should have recourse to catheterization and not hesitate to enlarge the incision so as to form a better estimate of the herniated parts.

As regards treatment, Ostermayer divides such cases into two groups, according as the bladder is wounded or intact. In the former it is necessary to resect as completely as possible the herniated vesical diverticulum. In spite of the suture, which should be made with the greatest care, the bladder should not be reduced, and the ring should be left open, so that the urine may flow out freely in case reunion of the vesical wound has not been obtained. When, on the other hand, the bladder is intact, it is better to reduce it and close the ring than to practice resection of the herniated portion, as many authors advise.

Guinard, of Lyons, ²¹¹_{Nov. 25, '94} from his own experience, as well as from that of others, concludes that general anæsthesia is dangerous in patients with hernia suffering from grave abdominal disease, depreciated in health, or in a state of collapse. When such patients have been anæsthetized, even without accidents, the operation is dangerous, because the visceral irritation may, by reflex action, produce arrest of respiration. The danger is greater with chloroform than with ether.

Anthony Bowlby, of London, ²_{Jan. 26, '95} reported a case of faecal fistula of two years and two months' standing, following herniotomy for strangulated hernia. An operation was performed which effected a cure.

Miscellaneous.

In a case seen by Tipiakoff, ¹⁶⁴_{June 5, '95} ordinary hernia with omental adhesions was diagnosed, an incision made in the linea alba, the adhesions separated, and the hernial ring cut. On opening the peritoneal cavity it was seen that the strangulated organ was the lesser omentum, which had dragged the anterior border of the liver and the stomach toward the hernial ring. The lesser omentum was resected and sutured in its hernial portion, the pedicle being sutured in the peritoneal cavity and the walls sutured with three rows of silk sutures. The results were excellent, all morbid symptoms disappearing.

At the Annual Meeting of the British Medical Association, in 1895, William Anderson²_{Oct. 10, '95} reported three cases of sackless hernia of the sigmoid flexure through the left inguinal canal, with anatomical specimen. He said that this variety of hernia arose from the absence of a mesentery, the gut being covered by peritoneum for only half its circumference. The bowel, having stretched its connections, slips down in the subperitoneal tissue and passes easily through the internal abdominal ring, which is not protected by parietal peritoneum. H. Morris had made an attempt to form a mesentery in a similar case. Anderson thought it was advisable, when operating, to close the inguinal canal as completely as possible.

In regard to retrograde incarceration of the Fallopian tube and vermiform appendix in hernia, Maydl⁸_{p. 17, '95}⁸¹⁴_{May 1} states that there are only nine cases of prolapse of the Fallopian tubes and twenty-four of the vermiform appendix (alone) in literature (Lejars, Brieger). He adds to them a case of each in which the distinctive feature was the fact that the basal part of the organ had prolapsed, the free end remaining in the general cavity. It is easy to understand that this would form a peculiarly dangerous variety of hernia, as the strangulated organ would lie in the peritoneal cavity and not in the hernial sac, and a general peritonitis would infallibly result. Another peculiarity of these two cases lay in the freedom from disturbance of the circulation in that part which was in the hernial sac, only the end of the organ being strangulated; so that, if an ordinary herniotomy were done, the surgeon would find no evidence of strangulation in the prolapsed portion and might be misled in his choice of the best method of treatment, unless he took care to draw down the end of the organ and inspect that, as well as the part lying in the hernial sac.

[Coley⁹⁶_{Apr., '95} reported two cases of the appendix (alone) and nine cases of cæcum and appendix in the hernial sac. He resected the appendix in but one case.—B. and C.]

According to L. Kraft,³⁷¹_{v. 36, '95} reduction should be attempted in hernia of the vermiform appendix if the latter is not perforated or gangrenous, in which case resection is indicated, the intestine being exposed, as in cases of gangrenous intestinal hernia. The author reports seven cases of hernia, in three of which the vermiform appendix alone was found in the sac and in the other four an additional loop of intestine.

W. B. Coley⁹⁶_{Aug., '95} presented to the New York Surgical Society a case of probable lumbar hernia operated upon by W. T. Bull over a year before. At the time of the operation the child was 1 year and 9 months of age. The tumor was then very near the tri-

angle of Petit; though a little too far anterior, yet it was thought to be really lumbar. The sac was opened and removed entirely, and the wound was closed in two layers, using kangaroo-tendon for the deeper sutures and catgut for the skin. Somewhat over a year had elapsed and there was no evidence of recurrence.

M. C. Galloway, of Zenia, O., ⁵⁹_{Mar. 9, '95} reported the case of a soldier who was a sound man physically when he enlisted. A short time afterward, while on a march, his belt, which held in



HERNIA FROM MILITARY DUTY. (GALLOWAY.)

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position his cartridge-box, cap-box, and bayonet-scabbard, became twisted and caused the shank of his bayonet to rub on his left side, at the exact spot where a hernia became located. Soon afterward he began suffering from a severe pain in his spine, from the coccyx to the base of the brain. From that time until the date of his discharge he was able to perform light duty only. When discharged the hernia was about the size of a partridge's egg and gradually grew to five inches in length by two inches

in width. About twelve years ago incontinence of urine began and is yet present, said to be due to spinal irritation.

An unusual case of multiple hernia with hydrocele and strangulated femoral hernia, in which operation was performed, followed by recovery, is reported by Ethelbert Collins, of Sawbridgeworth. ⁶_{Aug. 24, '95} Chavannaz, of Bordeaux, ¹⁸⁸_{June 30, '95} observed a case of saccular pseudocyst with hernial lipoma. In operating upon the patient the femoral vein was wounded, but was sutured immediately with catgut. The recovery was uneventful. Tenderich ¹¹⁴_{B. 41, H. 1, 3, '95} adds three new cases of hernial tuberculosis to the nineteen already recorded in literature.

Notes of three cases of hernia of an exceptional nature are given by W. G. Spencer, of London. ⁶_{May 11, '95} The first was a case of strangulated femoral hernia (Littre's), the sac containing a gangrenous diverticulum, the spread of gangrene to the gut being internal to the stricture. Peritonitis occurred and resection of the gangrenous gut was necessary. The second case was one of intestinal obstruction with kinking (?) of the gut in the region of the cæcum from a subperitoneal lipoma, with subsequent gangrene of the greater part of the small intestine, in a pregnant woman who was the subject of tertiary syphilis and nephritis. The third case was one of strangulated inguinal hernia, in which abdominal section was performed and reduction effected *en masse*, followed by intestinal paralysis and death.

Duplay, of Paris, ³⁶⁰_{Apr., '95} treated a case of hernia of the large intestine into the sheath of the right abdominal major and simulating a fibroma of the wall.

Delagénère, of Mans, ⁶⁷_{Sept. 15, '95} observed a case in which inguinal hernia with ectopia of the testicle gave rise to hysteria, etheromania, and inebriety in a man 32 years of age. Complete recovery followed radical cure of the hernia.

In a case of ruptured foetal cyst of the tube simulating strangulated inguinal hernia Malherbe ⁷_{Jan., Feb., '95}; ²_{May 4} cut down on the sac, which was large and tense. A quantity of treacly liquid blood escaped, but the sac was absolutely empty. Much blood issued from the internal ring; so the parietes were freely incised. Black blood and masses of clot then came away in abundance. The uterine appendages were drawn up, and a small, ruptured, tubal sac discovered. The tube and ovary were removed, and the pelvis and peritoneal cavity cleared of clot. The long incision in the parietes was closed very carefully,—the peritoneum and musculo-aponeurotic layers with interrupted silk sutures, the skin with silk-worm gut. The patient recovered.

DISEASES OF THE RECTUM AND ANUS.

BY THE CENTRAL EDITORIAL STAFF.

SUBMITTED FOR COMMENTATION TO

CHARLES B. KELSEY, M.D.,

ASSOCIATE EDITOR,

NEW YORK.

Tumors: Cancer of the Rectum.

Kraske's Method.—Jos. P. Bacon, of Chicago, ¹¹⁵⁰_{Jan., '95} expressed the opinion that the modifications in Kraske's method for the removal of pelvic growths have special advantages only in those cases in which the growth or stricture involves the centre of the rectum, and when, after the removal of the latter, the ends of the gut are reunited. The excision of a part or all of the two lower sacral vertebræ and coccyx, together with the entire removal of the anus and rectum for an extensive cancerous growth, seems rash at first thought, but the good results obtained by this operation in otherwise hopeless cases justify its claims. The author records three cases operated on by himself, with two deaths and one recovery.

In the discussion of Bacon's paper Senn ²⁷_{Feb., '95} feared, from the author's remarks and from his collected statistics, that the value of the much-lauded Kraske method has been greatly overestimated. While Kraske has been considered the originator of this method by common and almost general consent, Collert was the first to conceive the idea of enlarging the field of operation by resection of the coccyx as a preliminary step in the operation for removal of the carcinomatous rectum; Kraske simply carried this principle farther, and, in addition to the removal of the coccyx, removed either in part or wholly the two lower sacral vertebræ. The daring which characterizes modern operating has carried the operation far beyond the Kraske limit. Rousseau, for instance, has recently extended the operation as far as the sacral canal, and claims for this certainly mutilating procedure the best results. Senn expressed the view that unnecessary resection of the sacrum was exceedingly harmful, as it greatly increases the mortality of the operation without furnishing sufficient advantages to justify its employment.

Carcinomata of the rectum extending no farther than four inches above the anus are readily accessible by simple preliminary resection of the coccyx. Sacral resection must be reserved for those cases in which it becomes absolutely necessary to open the peritoneal cavity in order to remove the diseased rectum. Senn has recently removed four inches of the rectum from a woman, quite advanced in years, without even a preliminary resection of the coccyx. By placing the patient in the proper position this was readily done. A simple median incision from the tip of the coccyx to the margin of the anus gives abundant room to deal efficiently with the lower segment of the rectum. He would, therefore, lay it down as a rule that the Kraske operation should be resorted to only in cases in which resection of the coccyx does not furnish ample room to deal with the malignant rectal disease. In all operations for carcinoma of the rectum severe hæmorrhage from the veins in the pararectal tissues occurs. This can be safely prevented by elevating the pelvis. He therefore places the patient upon a low cot, with an enormous triangular pillow under the pelvis. The arterial hæmorrhage can be easily controlled by the use of hæmostatic forceps, but the venous hæmorrhage, unless this position is resorted to, is exceedingly difficult to control. He protests against the too prevalent practice of attempting radical operation in improper cases, and regards the following pathological conditions as absolutely contra-indicating all radical operations: 1. Carcinoma that has extended beyond the rectal tissue, invading the loose connective tissue, irrespective of the location of the carcinoma. This condition is readily determined by rectal examination. When the surgeon finds the rectum immovable at the seat of the disease,—imprisoned, as it were, in the pararectal carcinomatous tissue,—no sacral operation, no matter how extensive, will prevent a recurrence. 2. Carcinoma that has involved the post-rectal lymphatic glands. This condition is incompatible with a permanent result, either by the Kraske or the old operation, and is much more benefited, and that for a longer period, by the establishment of an artificial anus,—a comparatively safe procedure. The surgeon must not be satisfied with immediate recovery from the operation, but must estimate the influence of the disease and calculate closely and accurately the benefits to be derived from the different operative procedures. Encouraging reports were published in Europe regarding the application of the Kraske method to the treatment of malignant or otherwise inaccessible benignant growths of the uterus and adnexa; but Senn fears that cases thus treated will be found to have died a few weeks or months after operation.

It is impossible, in the majority of cases, to bring the rectum down to the anus and hold it there, because on the proximal side of the carcinoma no dilatation has taken place, as the growth has produced no obstruction. In cases of circular carcinoma of long standing, however, in which great dilatation has occurred, it is easy to bring down the rectum and sew it to the anus. In these cases, instead of causing unnecessary pain and exposing the patient to great risk of infection, Senn establishes a sacral anus in the upper angle of the wound. He has had a number of such operations, and the patients have been as comfortable as though he had sewed the bowel into the anus. He therefore regards Kraske's procedure as advantageous in carcinoma characterized by diffuse infiltration without stenosis or obstruction.

He has resected the rectum at least fifteen times by means of the Kraske method, with one death. In about three cases the same operation was performed for cicatricial stenosis without a death. He has always been extremely careful in not carrying the resection of the sacrum beyond its legitimate limit, and at the same time guarding against profuse hæmorrhage by position and by resorting to the finger in preference to cutting instruments in removal of the rectum. He is inclined to call this rather an enucleation of the rectum for carcinoma than an excision. The surgeon who removes the carcinomatous rectum by excision will have a great mortality; while the one who follows the loose connective-tissue spaces, resorts to blunt instruments, and carefully guards against hæmorrhage will show the best results. At the same time the surgeon should not attempt to do too much after the carcinoma has been removed.

The more experience he has in rectal surgery, the more he is convinced that efficient and adequate drainage is an absolute necessity to ward off sepsis. He therefore leaves a large part of the wound open and tampons with iodoform gauze for thorough capillary drainage. This procedure prevents the accumulation of primary wound secretions, which always appear in this locality, and which must be regarded as a direct, fruitful source of infection, the primary wound secretions becoming the culture-medium for pathogenic germs. He cautions against the too indiscriminate performance of extensive sacral resection as a preliminary step to resection of the carcinomatous rectum or removal of carcinoma of the uterus.

L. C. Lane, of San Francisco, ^{May, '95} 147 calls attention to the fact that, in 1885, Lawson, an Englishman, advised rectal excision; and it seems to him that in regard to this outside operation—that is, excising from behind—the credit is probably due to Lawson,

rather than to Kraske, who has generally the name of having done it first. Lawson, in 1885, reported a case upon which he operated successfully by a horseshoe incision, made on the back part of the pelvis, in which he reached in and cut out a part of the coccyx, curing his case.

H. Allingham, of London, ²²_{Apr.17,'95} remarks that Kraske's operation is only fitting in cases in which the disease extends high up the bowel, and that it should only be employed when the growth is freely movable on the tissues beneath. The operation is a severe one, but not nearly so much so as might be imagined.

Jos. M. Mathews, of Louisville, ⁶¹_{July 20,'95} expresses himself as opposed to total extirpation of the rectum, since there can be no assurance that infiltrated tissues are not left behind.

J. McFadden Gaston, of Atlanta, ⁵⁹_{Nov.30,'95} states that, when carcinomatous induration of the rectal tissues is detected early, there is encouragement to undertake an operation, but after the breaking down of the neoplasm with infiltration of surrounding structures no benefit is derived from excision of the parts involved.

Paul ²_{Mar.9,'95} records fourteen cases of excision of the rectum and advises Kraske's operation in cases where the upper limit of the growth cannot be defined from the anus.

Hofmohl, of Vienna, ²²_{May 15,'95} showed the medical society of that place a woman, aged 65, who, two years ago, had been operated on by Kraske for carcinoma of the rectum situated five centimetres above the anal orifice. It was difficult to pass the finger over it. It covered three-fourths of the circumference of the bowel and was slightly movable. The woman was then perfectly well, wearing a wadding tampon, which she supported with a T-bandage.

At the London Medical Society Swinford Edwards ²_{Feb.16,'95} showed two successful cases in which Kraske's operation had been performed. One of these was a woman, aged 50, who had a cancer opposite the middle of the sacrum. The coccyx and lower part of the sacrum were removed, the peritoneum freely opened, the cancerous segment excised, and approximation effected by means of Murphy's button. Clutton, at the same meeting, observed that in women Kraske's operation was not always necessary. He preferred to do a preliminary inguinal colotomy, then prolong an incision from the anus along the margin of the coccyx, open the peritoneum freely, and bring down the rectum or the sigmoid flexure above the growth and stitch it to the skin, sweeping away the whole of the rectum from that point downward.

L. von Stubenrauch, of Munich, ³⁴_{Sept.11,'94} operated five times by the sacral method, two of his patients dying and three recovering. The operation presented no difficulty, except that in one case the

peritoneum was accidentally opened in isolating the upper part of the intestine. The incision was sutured and caused no complication. In three cases circular suture of the two ends of intestine was employed, but the sutures loosened at the posterior wall of the rectum.

Fenger, of Chicago, ¹¹⁵⁰_{Jan., '95} lays great stress upon the location of the cancer, as to whether it is high or low, in causing the high or low percentage of mortality after the operation. The peritoneal cavity must be opened in all cases of high cancers, while it is rarely opened when the cancer is situated very low. He has collected statistics of 18 operations for high carcinoma, with a mortality of 50 per cent. In the 192 cases recorded by European and American surgeons there were 58 deaths,—a mortality of 28.4 per cent. These cases date back to the beginning of the operations, and many of them were operated upon that would be classed as inoperable to-day, and thus the present mortality for the operation would be very materially lessened. Kraske reported, in 1885–1887, 10 cases, with 4 deaths,—a mortality of 40 per cent. König collected statistics showing a mortality of 24 per cent. Recently von Bergmann has reported 27 cases, with only 1 death,—a mortality of 3 per cent. Thorndike has collected statistics showing an average mortality by the old method of 16 per cent.

As only those cases of cancer or stricture situated low in the rectum or at the anus are operable by the old method, the statistics are in favor of the new method.

In conclusion the author cites the following advantages of the sacral over the old method: By removal of the coccyx and a part of the sacrum operation upon the rectum is comparatively an open one and the hæmorrhage can be reduced to a minimum. The operation can be rapidly done. Growths that were inoperable by the old method are readily removed. It prolongs life and gives greater comfort than colotomy. Fæcal continence is much greater than after colotomy.

J. H. Dunn, of Minneapolis, ¹⁰⁵_{Apr. 15, '95} in an extensive article on resection of the rectum, reaches the conclusion that resections involving the middle or even lower part of the upper portion of the rectum give better after-results than those in which the whole of the lower portion is excised, and need not give much, if any, greater mortality. It is desirable to preserve as much of the lower portion as possible, and when the disease does not involve this part the floor of the pelvis ought not to be disturbed, or, at most, not more than laid open behind by a single smooth incision. The excision should then invariably be made through an opening in the posterior wall of the pelvis, extending from opposite the third

racial foramen to the tip of the coccyx. The latter bone is removed and more or less of the left border of the sacrum may be chiseled away or the sacro-sciatic ligaments divided close to the sacrum, as circumstances may require. When it is necessary to sacrifice the pelvic floor on account of the low situation of the disease, this free posterior opening of the pelvis is usually necessary in securing free drainage and in order properly to loosen up and bring down the gut. When the resection is entirely above the levator ani, very excellent voluntary control of the bowel may be preserved by this method. When performed upon proper principles, and with experience and skill, and in appropriate cases, resection of the rectum is a useful procedure, without a great primary mortality, and often with excellent secondary functional results, and, indeed, generally with fairly comfortable bowel control.

In a case operated on by Körte, of Berlin, ¹¹⁵³_{Sept. 23, '95} the patient recovered from operation, but returned a year later with recurrence in the cicatrix. Operation showed that the new growth had no relation with the bony cicatrix, and that the latter was covered with a smooth fibrous tissue. In a second case the patient attributed the soft tumor, into which the sacrum was transformed, to a traumatism three years previously. Körte curetted the sacrum and cauterized the surface with the thermo-cautery. Recurrence took place in eighteen months, necessitating resection of the sacrum. Monprofit, of Angers, ¹⁰⁴³_{Dec. 1, '95} records the cure of a sacral anus after ablation of cancer of the rectum.

Charles C. Allison, of Omaha, Neb., ¹¹⁵⁰_{July, '95} states that reported cases up to date show a mortality after Kraske's operation for cancer of 30 per cent., with recurrence in 40 per cent. of recoveries. This includes, however, many inoperable cases, as proven by a mortality of 8 per cent. in the hands of some surgeons in properly-selected cases. L. L. McArthur ¹¹⁵⁰_{July, '95} called attention to the fact that Kraske was receiving much condemnation for what he had not recommended, and that Bacon, in his operations, had extirpated the lower segment of the rectum and the anus, which is not the Kraske operation. The operation he devised was to resect the bowel and unite it by sutures, leaving the sphincters intact. Other operations should not bear his name, nor should he bear the ignominy of their failures.

Kelsey ¹_{Dec. 8, '94} states that his own experience has taught him rather to expect recovery without serious accident in a clean and antiseptic Kraske operation when the upper end of the gut is well vitalized at the point of section and is brought out behind and stitched to the skin at the part left vacant by the removal of

the end of the sacrum. Union soon takes place; fæces escape on the surface of the body and do not contaminate the wound, which may be expected to heal in part by primary union; and the patient makes a rapid recovery without high temperature. In the author's opinion, however, the operation is not the ideal one. The disease is removed, it is true, and the great object of operating is thus accomplished; but the after-condition of the patient is not as good as after a colotomy.

Miscellaneous Operations.—From an experience of five cases operated on by the sacral method, as modified by Bergmann, C. Koch³⁴_{Nos. 6, 7, '95} concludes that this procedure is simple and affords a large opening in the lesser pelvis, even when the cancer is high up; while resection of the sacrum, when necessary, does not complicate the operation. The prognosis as regards immediate results is favorable, since infection of the wound, as often primary as secondary, may be avoided. It is also better as regards recurrence, for by cutting through healthy tissues inoculation is avoided. From a functional stand-point, the present methods require improvement.

In a case of amputation of the rectum with excision of the coccyx, by the Kraske method, the modifications adopted by Gustave Zinke, of Cincinnati,²⁷_{Feb., '95} consisted in tying the gut below and above before the operation was finished, in not amputating it until after the closure and dressing of the wound, and in sewing the margin of the bowel to the edge of integument. The external toilet of the wound consisted of nothing but sterilized gauze and cotton, kept in position by a T-bandage. The woman was permitted to lie upon her back and sides, according to her own wishes and inclination.

Montaz, of Grenoble,³¹_{Jan. 2, '95} combined the procedures of Lisfranc with those of Kraske, Bardenheuer, and Roux in a case of rectal cancer. The height to which the disease had extended is, in his opinion, of no importance as regards the operation, but the relations of the cancer with the surrounding parts are of great moment. Any case in which the posterior wall is affected, even when there are adhesions, is operable; the only inoperable cases are those in which the anterior wall is involved, and where the cancer is diffuse, spread out, and adhesions have formed between the pelvic organs, as the uterus, prostate, or bladder.

Routier⁴¹⁹_{p. 646, '94}⁴¹²_{July, '95} describes Moulonguet's modification. The coccyx is resected, as done by Kraske, with the patient on the right side, but the incision stops short of the anus three or four centimetres. The patient is then turned on the back and the lower part of the rectum dissected out, taking care not to remove

the sphincter ani; this dissection is carried above the growth, which is removed by a transverse division of the bowel. The divided end of the intestine is then brought down within the anal sphincter, this manœuvre being accomplished by traction with a forceps introduced into the anus and by the fingers introduced through the posterior incision. Care should be taken not to twist the bowel on its axis. Moulouguet's first operation was done in 1890 on a very extensive case, and death ensued from shock in fifteen hours. The second case was successful, and the patient had full control over his rectum. The growth in this case did not go beyond eight centimetres above the anus. Routier does not think that the operation is applicable to very high cancers, on account of the impossibility of bringing the divided end of the bowel down into the anus.

N. Velianimoff ¹¹⁵³_{May 4, '95} recommends the procedure first proposed by Ivanoff,—viz., excision of the lower part of the rectum combined with colostomy, which permits of protecting the wound from infection through the intestines, of making a much more extensive intervention, and of avoiding, by means of colostomy, functional disturbances of the large intestine. With simple rectotomy fecal incontinence is very likely to occur. Ivanoff's method is especially indicated in cases where the disease is extensive, as, for instance, in women in whom the recto-vaginal septum is involved.

Rehn ³³⁶_{No. 10, '95; May 4} states that in women the growth can be readily removed through a vertical incision made in the middle line of the posterior wall of the vagina and carried backward in the perineum as far as the external sphincter ani. By such an incision he was able, with very little difficulty and without much hæmorrhage, to remove an extensive cancer from the rectum of an aged woman. The incision of the posterior wall of the vagina, he states, permits of free removal of a large malignant growth and facilitates the separation of the diseased mass from the surrounding soft parts. The rectum having been plugged with antiseptic gauze and the vagina thoroughly disinfected, the posterior vaginal wall is carefully incised and separated from the diseased gut. The perineum is next incised in the middle line and the rectum below the seat of disease isolated, ligatured, and divided. The upper and cancerous portion of the gut is now drawn through the vaginal wound and excised. This stage of the operation, it is asserted, can be effected with but little hæmorrhage and with free exposure of the diseased structures. An opening in the peritoneum can be readily dealt with in this operation, and any enlarged glands in the mesorectum can be removed without difficulty.

Colotomy.—L. H. Adler, Jr., of Philadelphia, ⁶¹_{July 20, '95} believes

that the inguinal region is to be preferred in the majority of cases. Its advantages over the lumbar operation are the following: 1. The smaller incision and lesser depth of the wound requisite to reach the colon and the minimum amount of disturbance of the structures overlying the seat of operation. 2. The greater facility offered for exploration of the abdomen when such a procedure is required. 3. The better position for safe anæsthesia during the operation. 4. The comparative ease with which the colon may be identified in this position and the little difficulty experienced in fixing the bowel to the skin without undue tension on the stitches. 5. The greater readiness with which a good spur may be formed. 6. The convenience to the patient of the site for purposes of cleanliness and for the adjustment of pads. 7. The recent statistics, which seem to indicate that it is the less dangerous operation.

Deansley, of Birmingham,⁸¹⁴_{Nov 15, '96} states that colotomy should never be performed without previous precise location of the obstruction. It is seldom that this localization can be made out without previously opening the abdomen. Left lumbar colotomy is only applicable to those cases in which the exact situation of the stricture is previously known; in all others a preliminary laparotomy is essential. In these cases the oblique lateral incision used for iliac colotomy not only allows the rectum, the sigmoid flexure, and descending colon to be thoroughly examined, but suffices also for making the colotomy should the obstruction prove to be in or below the sigmoid. Should the latter be found empty and below the obstruction, a second incision may be made over the cæcum, and the colotomy be made there.

In cases of cancer with involvement of the retrorectal glands Briddon, of New York,⁹⁶_{Jan., '95} would perform permanent colotomy, amputate the diseased rectum, and make no attempt to restore the continuity of the canal. He found it almost incomprehensible how fæces could pass by the spur of an inch to an inch and one-half formed in inguinal colotomy, but they usually did and gave trouble; fortunately, however, the patient could be assured that it would be likely to cease within a few weeks.

Kelsey¹_{Dec. 8, '94} states that it may be safely asserted that, if a patient is to have an artificial anus anywhere, the best place for it is in the left inguinal region, and not over the sacrum. Out of 3 deaths occurring after 40 colotomies, only 1 could be attributed to the operation, or, rather, to an accident. This case was progressing favorably when, on the second night after the operation, the bandages were found soaked in serum, which had wet them through and was soaking into the bed. All night the patient was allowed to remain in this condition before the wound was ex-

amined and Kelsey sent for. Then it was found that many feet of small gut had escaped through the incision and were lying under the dressings,—strangulated, matted together by plastic exudation, etc. By the time the parts had been replaced the patient was in a condition of complete shock. This unfortunate case supports the author's teaching, to the effect that sudden and profuse discharge of a large amount of serum from the abdomen after colotomy is a sign that some part of the wound has given way, and should lead to immediate removal of the dressings for inspection. If hernia be found, it is an easy matter to reduce it, and a stitch or two in the wound will keep it reduced.

Two cases of sigmoid colotomy for cancer of the rectum are recorded by Anderson, of London, ²²_{July 3, '96} one of which was remarkable on account of the youth of the patient,—a girl of 15 years. So far as he is aware, no case had been recorded of such a condition in so young a subject.

Stricture of the Rectum.

J. McFadden Gaston, of Atlanta, ⁵⁹_{Nov. 30, '95} maintains that 60 per cent. of the cases of stricture of the rectum arise from syphilis or are the result of it. He had asked his professional friends to investigate this matter and make known their investigations. The responses he had received were nearly all in the affirmative. He regards stricture of the rectum as more frequent than either cancer or tubercle.

In a study of syphilitic strictures of the rectum Hartmann and Toupet, of Paris, ³_{Mar. 27, '96} reach the conclusion that, though in certain cases there appears to be a direct relation between the local syphilitic or tuberculous lesion, in the majority of cases the stricture will be found to depend upon a stenosing rectitis, syphilis, when present, having but facilitated the entrance of the infectious process into the mucous membrane. The importance of this inflammation—which, at the period at which the patients are seen, already involves a large part of the rectum—explains the difficulty of treatment. It was at one time thought that extirpation of the stricture would bring about a radical cure, but to-day the opinion on this point is more reserved. Although definite cure may be hoped for after the extirpation of a congenital stricture or after one due to a band, the same is not true of the so-called syphilitic stricture. Continuous observation of nineteen patients thus operated on showed definite cure in none. In all there was a persistent flow from the anus and a tendency to stenosis, explained by the persistence of the rectitis which had caused and accompanied the stricture.

Verneuil, of Paris, ¹²⁶_{p. 653, '96} had under treatment a man whose case Fournier regards as confirming his belief in the syphilitic nature of simple or fibrous rectal stricture. This view has been contested on the ground of the usual inefficacy in these cases of specific treatment, but Fournier attributes failure to the fact that treatment had been applied too late, when sclerosis had done its work. He calls attention to the cases in which, with a rectal stricture, there exist ano-rectal and ano-perineal lesions, the gummatous nature of which can be recognized *de visu*, especially when these lesions are ulcerated. In such cases regular anal fistulæ may develop (syphilitic fistulæ, described by the late Trélat). Le Dentu, although he has only met with one success from the specific treatment of stricture of the rectum, concurs with Fournier's views as to the syphilitic origin of so-called simple strictures.

Schede, of Hamburg, ³³⁶_{July 6, '95} has performed 14 resections for syphilitic stricture, of which 12 were successful. In 2 cases the operation could not be completed, the ulcers being too high about the anus. This operation is much more difficult than that for carcinoma, but he, nevertheless, prefers it to colotomy.

In a discussion before the Berlin Society of Surgeons ⁴_{Sept. 17, '94} Knecht stated that Wolff had successfully operated in a case of stricture of the rectum of syphilitic origin in a woman aged 38 years. He quoted Arthur Schulz ²⁰⁸¹_{'93} as having collected 20 cases of resection for ulcerous stricture, with 15 perfect recoveries, 4 incomplete, and 1 death from hæmorrhage. Of the 15 cures only 6 were durable, the others not having been under observation for a sufficiently long time. In 2 recovery was definite at the end of eight months, in 1 in one year, in 1 in fourteen months, and in 2 in two years. Of these two latter Wolff's case, to which he had referred, was one and Israel's ³⁰¹_{'93} the other. To these 20 cases must be added that of Herczel, ⁸⁴_{No. 27, '92}—a case of syphilitic stricture high up and treated by the sacral method. On the other hand, up to 1876 Van Erckelens ²²⁶_{B. 23} had already collected 48 cases of colotomy for ulcerous stricture of the rectum, among which 30 died during the first weeks after operation, 13 were incomplete cures, and only 5 perfect cures after a period of at least one year. Knecht has found 21 additional cases; or, in all, 69 cases, with 7 recoveries at the end of one year, 25 operative recoveries without knowledge of the ultimate result, 37 deaths following soon after the operation; or 10 per cent. of cures by colotomy as against 20 per cent. by resection. In the discussion Lindner stated that Israel, who was the first to recommend resection of the rectum for ulcerating stricture, recognized the fact that it was but rarely indicated. Thiem said that he obtained perfect recovery in the case of a woman

on whom he had performed colostomy. After catheterization, disinfectant irrigation, and antisyphilitic treatment he had closed the artificial anus. The patient had been in excellent health for three years, married, and bore a healthy child. Wolff, while congratulating Thiem on his success, stated that until now it was the only case in which it had been possible to close the artificial anus without causing the recurrence of the ulcerations.

Schuchardt,⁴_{Oct. 8, '94} in support of his belief in the syphilitic nature of stricture of the rectum following ulcerations, says that he has found, in one-half of his cases, the anatomo-pathological lesions of syphilis,—atrophy of the closed follicles at the base of the tongue, cicatrices on the tibia or skin, and hepatic gummata. He reports three cases in which he was able to follow the course of the disease from the onset and in which the microscope revealed miliary gummata irregularly disseminated throughout the layers of the intestinal wall as far as the muscular coat, forming, at the ulcerations on the surface of the mucous membrane, velvety blue-black projections, which Schuchardt considers as pathognomonic of the gummatous stage of syphilis of the rectum. As regards the prognosis, it is hopeless if it be not possible to entirely extirpate the involved portions,—that is, if the superior limit cannot be reached by the finger. He has seen several cases of fatal peritonitis following violent dilatation of strictures. On the other hand, local treatment of the ulcers, such as curetting, cauterization, etc., have never given him the least result. In inoperable cases he confines himself to establishing an artificial anus.

Sourdille²⁰⁰⁰_{'95} has made an extensive study of cylindrical and annular tuberculous strictures analogous to those called syphilitic. He has collected records of seven such cases—some complete, others containing only an anatomical examination—in which a diagnosis had been made and confirmed by bacteriological and histological examination, and in which it was shown that a certain number, perhaps a third or a fourth, of cases called syphilitic were, in reality, tuberculous. These patients are usually from 15 to 35 years of age; generally the disease is primary, and when secondary is most frequently consecutive to adjacent tuberculosis, as of the intestine, cæcum, penis, or anus. From an anatomical point of view there are three periods: (1) that of infiltration; (2) organization of the infiltration; (3) sclerosis. Clinically the signs are the same as in all other forms of rectal stenosis. There is at first a period of rectitis, with functional disturbances, pain, tenesmus, constipation, and diarrhœa; on palpation the rectum is swollen or the surface is irregular with soft projections, resembling dysentery and lasting from five weeks to one year. In the second period the

condition improves for from two to five years, with or without treatment. In the third period defecation becomes difficult, accompanied with sanguinolent pus or abscess about the margins of the anus and attacks of abundant diarrhœa. Palpation shows the sphincter to be retracted, the stricture being usually just above the anus or in the ampulla, six to eight centimetres in extent, with rigid, irregular walls, covered with hard or elastic excrescences which bleed easily. If not treated the condition extends until it involves the bladder and prostate, this fact being one of the best aids in diagnosing it from syphilitic stricture. Phenomena of intestinal obstruction, or of cachexia due to generalized tuberculosis, at length supervene. Sourdille recommends extirpation by Kraske's method when the stricture is below or circumscribed, and the formation of an artificial anus when it is situated high up.

Out of a total of 99 cases seen by Kelsey¹ at the New York Post-Graduate Hospital 49 were malignant and 50 non-malignant. The usually-accepted statement that stricture was nearly twice as common in females as in males was not supported. Of the non-malignant cases 4 were of dysenteric origin. Six cases were congenital and 6 were due to pressure or obliteration from diseases originating in the neighborhood of the gut. One case was distinctly tubercular. The remaining 33 cases were of the kind usually considered as syphilitic; in only 6 of these was there any syphilitic history, while in 1 only could syphilis be considered as the probable etiological factor, lupus being also an element of the case. Instead of attributing the 32 other cases to syphilis and to some pathological process of which we know nothing connected with that disease, Kelsey prefers to consider them as the result of simple proctitis, proliferating and contracting in its results, which may be set up by any local injury to the part, and which, once having passed the early stages, is practically incurable. Anything which causes an abrasion of the mucous membrane may cause a stricture of this variety if the abrasion goes on to ulceration and the ulceration is not cured by proper local treatment. He states that this history has again and again been forced upon his attention, and it will, in time, he thinks, be allowed its proper weight with all those who are not so overawed by the mass of authority in favor of the syphilitic idea that evidence to the contrary has no influence upon them. Constipation and fecal impaction, surgical operations, and injury to the rectum in childbirth are some of the every-day causes of the so-called syphilitic stricture, both in those who have had and those who have not had syphilis. The diagnosis of tuberculous stricture of the rectum is discussed by T. H. Manley, of New York.

Tillaux, of Paris, ³¹_{Oct. 23, '95} discusses anew the subject of partial stricture of the rectum, which he claims to have been the first to point out some years ago. This form of stricture may give rise to anal fistula of a peculiar and generally of a serious kind, which can only be cured by treating the stricture itself. His first case, seen a number of years ago, was that of a vigorous cavalry officer who suffered from two anal fistulæ situated in the orchiorectal fossæ. Rectal palpation posteriorly revealed a transverse band, which Tillaux cut with a blunt bistoury. Fifteen days later the fistulæ were completely cured. Since that time he has seen many other cases of the same kind, one of them, a man of 52 years, having twelve anal fistulæ for fifteen years. The band was found and cut, and within eight days two-thirds of the fistulæ had become cicatrized. The band in these cases usually occupies the posterior part of the rectum, the anterior part being normal and elastic. If the patient lie on his back it cannot be felt unless the finger be directed back, about three centimetres above the anus, near the upper sphincter. Above this band the rectum is distended and the ampulla enlarged. The fistula occurs behind the band, which the author believes to be congenital in origin, a sort of incomplete anal imperforation.

Schede ³³⁶_{July 6, '95} records fourteen cases of resection of the rectum, performed for stenosing ulcer of the part, five of which had an ideal result and seven a fairly satisfactory one. In one case the sphincteric function had not returned and one patient died of ulcers situated so high up that they could not be reached. The operation was more difficult than in carcinoma recti, but was decidedly preferable to colotomy.

James P. Tuttle, of New York ⁵¹_{Mar., '95} observed incontinence of fæces and diarrhœa from stricture of the rectum without ulceration.

Rectal Stricture in Women.

Henri Hartmann, of Paris, ⁴⁸_{Dec., '94} observed the case of a woman in which peritoneal phlegmasia, ending in agglutination of a rectal fold, had caused partial occlusion of the intestine. He urges that in such cases it is necessary to bear in mind that anterior peritoneal tuberculosis may cause adhesions in the lesser pelvis independent of any previous disease of the appendages. An occlusion due to agglutination of the rectum, maintained by an adhesion at the hollow of the large sacrum, was overlooked in a spondylolisthetic pelvis. Another frequent variety of perirectal occlusion is that due to thickening and bands of the appendages encroaching on the rectum. The author cites a number of cases from literature, and states that these conditions may be combined

in women in whom the lower part of the broad ligament is in a state of suppuration. Laparotomy is indicated in these cases, the patient being placed on an inclined plane so as to permit of the lesser loops of intestine descending toward the diaphragm, to avoid all errors of diagnosis and permit of thorough exploration.

In a case of fibrous stricture of the rectum recorded by Lonnberg³⁷⁰_{v.56, No.12} the fibrous structure was extirpated and was found to include the entire rectal wall, being one centimetre thick and one and one-half centimetres high. According to Berg, who examined the case, the condition probably originated by inflammation of the Bartholinian gland working its way to the rectum through a fistula which was observed at the operation. (Report of Corresponding Editor Eklund.)

Fränkel³⁴_{June 11, '96}; ⁸¹⁴_{Oct. 15} studied the peculiar form of ulceration of the rectum which affects women almost exclusively (Virchow has only seen one case in a man), always attacks the rectum three to four centimetres above the anus, and has the characteristic sharp edges and a base formed of the exposed muscular fibres of the rectal wall, with, in old cases, abundant proliferation of cicatricial tissue surrounding the organ and producing a stricture. He believes fully in the syphilitic origin of these ulcers, for, although there may be no clinical facts upon which to base the diagnosis of syphilis, in seven out of nine autopsies upon patients who had died with this lesion of the rectum evidences of syphilis were found in other organs. Incidentally he emphasizes the importance in doubtful cases of that atrophy of the glands at the base of the tongue, leaving a smooth surface (without any scars or ulceration), long since pointed out by Virchow as characteristic of syphilis. The microscopical changes in the tissues are also in favor of syphilis as the cause of the ulceration of the rectum. He considers the situation of the ulcer so far above the anus sufficient to exclude the possibility of a gonorrhœal origin. As to the reason for its frequency in women, he urges the common occurrence of habitual constipation in them,—a theory which is also favored by the peculiar situation of the ulcer. In the way of therapy, he thinks that nothing offers so much hope as the complete extirpation of the diseased portion, in spite of the great difficulty of the operation, rendering it sometimes almost impossible even to such a surgeon as Schede.

Campeçon, of Paris,¹⁷_{Oct. 25, '94}; ¹_{Nov. 17} describes a method of excising non-cancerous strictures of the rectum by way of the vagina. The patient lying on her back, the finger is introduced into the rectum and the whole recto-vaginal septum cut through by transfixion from the fourchette to the anus, making a very large open

surface. Sutures are inserted into each of the vulvo-anal flaps thus formed and a transverse incision through the intestine is made at the lower border of the stricture, after which the rectum is dissected out from below upward and the whole length of the stricture isolated. The next step is to make a second transverse incision through the rectum at the upper border of the stricture and cut out the strictured portion. Finally, the upper part of the rectum is stitched to the lower part and the sphincter re-established at once by special points of suture and the operation finished like an ordinary perineorrhaphy. A patient on whom the author had operated by this method had recovered completely and had perfect control of the sphincter.

Gonorrhœa of the Rectum.

It has always been supposed that gonorrhœa of the rectum is met with very rarely, and, as a consequence of this, the subject is not touched upon in most text-books, not even in those of special nature. Neuberger and Borzeski⁵⁸⁶ ⁴⁹_{No. 1, '95; May, '95} were able, in a comparatively short space of time, to observe five cases (all in women) of gonorrhœa of the rectum. Pus was obtained for purposes of investigation, by means of a blunt spoon, from the rectal mucous membrane, and on microscopical examination fully typical gonococci were always met with (stained by the method of Steinschneider and Galewski).

In the authors' opinion, the ulceration of the rectal mucous membrane deserves to be recognized as the pathognomonic sign of anal gonorrhœa. They consider, however, that the gonorrhœal infection produces only the inflammation of the rectal mucous membrane, and that the ulceration is due to a secondary cause, —from mechanical irritation of retained hard feces or of foreign bodies in pederasty. There are no evident distinctive signs by which these ulcers can be distinguished from ulcers of other origin (dysenteric, tubercular, traumatic). Histological examinations of bits of the tissue, which were obtained in one case, also gave no special result. The only means for unerring distinction of the described disease is the microscopical examination of the secretion of the rectal mucous membrane. As far as the etiology of the secondary disease is known, pederasty forms its most constant cause; after that the spread of pus from the urethra or the vagina to the anus, and, lastly, the opening of an inflamed Bartholinian gland into the rectum. The treatment usually lasts a long time, for even in recent cases the disease may spread very widely and is liable to recur.

A case of gonorrhœal proctitis, endometritis, salpingitis, and

oöphoritis described by C. E. Lockwood¹_{Dec. 15, '94} is interesting because of the following points: 1. The gonorrhœa of the rectum which attracted attention when there were no symptoms of gonorrhœal inflammation of the urethra, vagina, or cervix uteri apparent. 2. The supervention of endometritis, salpingitis, and ovaritis about a month after the appearance of the rectal discharge. 3. The efficiency of ichthyol-and-glycerin tampons in curing the disease without recourse to operative measures. 4. The necessity of looking beyond the vagina for evidences of gonorrhœa, as, according to Bumm, it is rare for the disease to begin in the vagina, usually showing first in cervix uteri or urethra.

Henri Hartmann, of Paris,⁴⁸_{Jan., '95} gives a good review of ano-rectal blennorrhagia, and reports a case in which the rectal disease followed the vaginal one about two weeks.

A case of gonorrhœa of the rectum without uro-genital blennorrhagia, in a child 6 years old, is recorded by Emily Lewi, of New York.⁵¹_{June, '95} No mention is made, however, of any attempt to verify the diagnosis microscopically.

Prolapse of the Rectum.

Charles B. Kelsey, of New York,⁴⁶²_{Aug., '95} in a case of chronic intussusception of the sigmoid flexure, drew the invagination down three inches outside of the anus, and, although it then appeared very much like an ordinary case of prolapsus, the point of invagination could still be distinctly felt two inches within the sphincters. A combined operation was done. Van Buren's old operation for prolapsus was performed for the purpose of lightening the anus, causing artificial stenosis, and preventing any further protrusion; then the abdomen was opened by the usual incision for colotomy. The sigmoid flexure was drawn upward into the wound to its utmost extent and stitched as securely as possible. Five silk sutures were passed through one of the longitudinal bands of the gut and through the abdominal wall, and the incision closed in the usual way. For two weeks the patient was compelled to have his passages in bed in the recumbent position. After this he was allowed free exercise. Six weeks after the operation the patient was complaining of some tenesmus and a drawing, painful sensation at the site of the incision on defecation, but there had been no re-appearance of the tumor. Three months after the operation all of the old symptoms had disappeared.

Bryant, of New York,¹¹⁵⁰_{Oct., '94} claims that in certain cases of obstinate rectal prolapse the formation of a vicarious channel for fecal discharge is justifiable, both as a palliative and curative measure, that the preliminary establishment of such a channel for the pur-

pose of cleanliness and the prevention of infection is justifiable in many grave operations for prolapse of the rectum, and that the dangers attendant on the formation of an inguinal anus are much less than those invited by the contact of faecal discharges with large operative surfaces of the rectum.

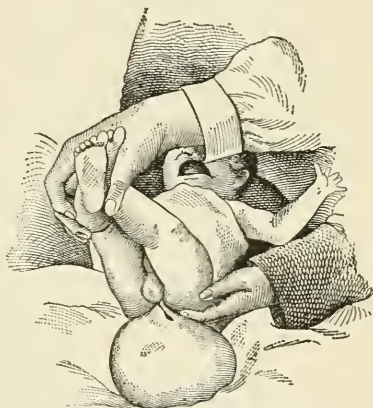
Latouche¹⁰⁴³_{Mar., '95} performed posterior rectopexy with perineorrhaphy in a case of rectal prolapse. Shortening of the mucous membrane appears to him a useful adjuvant in such cases, but he attaches especial importance, after fixation of the rectum by perineo-coccygeal sutures, to the reforming of the perineum and advancement of the anus, these being indispensable in preventing recurrence of the prolapse.

Bogdanik, of Biala,²⁰⁶¹⁹⁶_{'94 ; Jan., '95} recommends, for the treatment of severe prolapsus recti, the resection which was first performed by Auffret.⁷³_{No. 34, '82} A year later Mikulicz⁵²⁰_{Nos 47, 48, '83} reported the operation with a thorough description of the technique. Billroth, Nicoladoni, Bogdanik, Nélaton, Périer, Krönlein, and Hoffa have made reports of successful cases. The technique of the operation presents no especial difficulty when the suture described by Bogdanik is used. The intestine should be emptied thoroughly by laxatives and enemata, and just before the operation tincture of opium should be given. The patient is placed in the lithotomy position and the apex of the tumor grasped by forceps in the hands of an assistant. The left index finger of the operator is introduced into the thoroughly-cleansed bowel, and an incision carried about the prolapsed bowel about one or two centimetres from the anal border. If the surgeon be convinced that there are no contents between the outer tube which has been cut about and the inner, the two tubes are united by interrupted sutures, which are applied between the wound and the anal orifice or border. An assistant holds one end of the threads, while the outer and inner intestinal tubes are united by means of the other until the whole ring is surrounded. Before each needle-puncture is made the wound in the outer tube is widened; so that after the suture has been completed the outer tube is separated circularly. A ligation of the vessels, as Mikulicz recommends in his method, is superfluous, and the loss of blood is very small. The inner tube is now cut off at the level of the incised wound and the mucous membrane of the outer and inner intestinal tubes united by a continuous suture. Bogdanik recommends the use of catgut, though the choice of suture-material is indifferent. After the completion of the suture the forceps are loosened and the stump of rectum slips back into place. An iodoform-and-opium suppository is introduced and the buttocks fixed by a firm adhesive strap.

Sarfert, of Berlin, ⁶⁵⁰_{Sept. 5, '96} describes the case of a woman suffering from a rectal prolapse, twelve centimetres long, bleeding at the slightest contact. He made an incision, eight centimetres long, near the spine of the left ilium, and laid open the colon, which was provided with a long mesentery. An assistant placed two fingers in the rectum as a guide, and Sarfert drew up the intestine until the prolapse was reduced, and fixed the mesentery of the colon to the parietal peritoneum by five sutures and the intestine itself by three other sutures through the serous and muscular coats. He then closed the abdominal wound by several rows of sutures. The patient was able to be up after the seventh day.

Miscellaneous Tumors of the Ano-Rectal Region.

H. M. Taylor, of Richmond, Va., ¹¹⁵⁰_{Jan., '95} removed a tubulo-dermoid tumor from the post-anal region of an infant. Its attachment was behind the anus, in the coccygeal region; the rectum was not involved in any way. An elastic ligature was applied to the pedicle, which controlled the hæmorrhage during the removal of the tumor very well. Five or six large, bleeding arteries needing ligation were tied, and at one point the capillary oozing called for the ligation *en masse* of a piece of semicartilaginous tissue. Some time during the night following fatal reactionary hæmorrhage occurred, as the family physician was not summoned until the following day. A dissection of the tumor showed it to be cystic in character; the cysts were filled with a thin, ropy mucus and lined with mucous membrane. It contained no hair or teeth, but an island of bone. A tuft of hair grew from a patch on the outside of the tumor; the hair was not long, as is often the case, but it was about as long and as thick as that on the scalp of a newborn baby.



TUBULO-DERMOID TUMOR OF POST-ANAL REGION. (H. M. TAYLOR.)
Mathews's Medical Quarterly.

F. H. Markoe, of New York, ⁹⁶_{Oct., '95} describes a case of sacro-coccygeal dermoid in a man, 34 years old, who had never been able to wear trousers on account of the tumor. It was removed by operation and found to weigh ten pounds. It contained a great deal of fat and gelatinous substance, and resembled the thyroid gland. Markoe has been able to find little literature on these

tumors. McBurney in the discussion said he had recently operated upon a case similar to that of Markoe. The tumor was much smaller, but it had the same pathological characters. Abbe also said that he had observed such a tumor in a child 6 months old. Lange had removed it afterward, and the child had made a good recovery.

Golding-Bird, of London, ²_{Dec. 22, '94} removed a post-rectal dermoid from a woman. It was of doughy consistency and covered with mucous membrane. Schulze ⁶⁹_{No. 22, '95} removed two such cysts from a woman aged 33 years. A case of perirectal sarcoma was observed by du Castel, of Paris, ¹⁴_{Feb. 20, '95} who first thought it to be a chancre.

Paul ⁶_{Oct. 20, '95} relates the case of a woman, aged 56 years, from whom he had removed a very large villous papilloma of the rectum. Symptoms of bearing down, a constant desire to defecate, and the passage of blood and mucus had existed for five years.

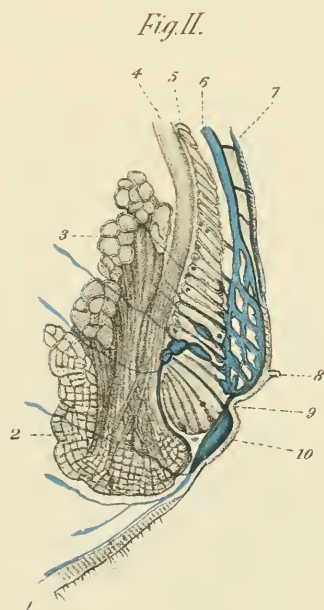
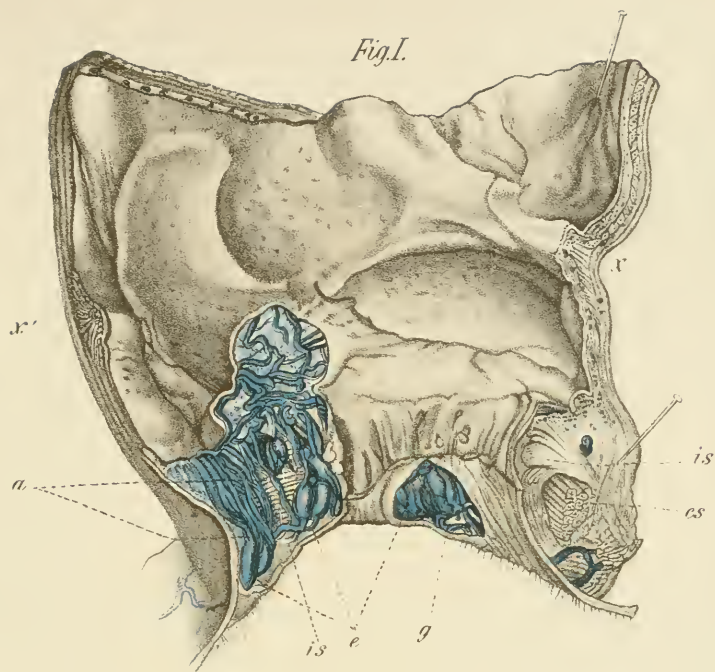
A. Mouchet, of Paris, ⁷_{Dec. '94} gives notes of a case of rectal polypus expelled during defecation by a 22-year-old girl. It was about the size of a small orange, round in shape, the surface dimpled. Microscopical examination showed the growth to be an adenoma. In each section the general aspect was that of a bouquet, a central stem supporting a multitude of ramifications forming alveolæ by their intermingling. The stem was made up of connective tissue inclosing a few connective-tissue cells, but especially slightly undulated connective-tissue fibres, in the midst of which Mouchet thought he could recognize the long nuclei of muscular fibres.

Hæmorrhoids.

In a study of external piles and their relation to the external hæmorrhoidal veins J. Walter Otis, of Boston, ⁵_{Feb., '95} publishes the annexed colored plate representing, first, an alcoholic preparation of the lower rectum opened lengthwise in the median line anteriorly, a portion of the mucous membrane and muco-cutaneous tissue having been removed to expose the internal and external hæmorrhoidal veins (Fig. I), and, second, a semidiagrammatic drawing of a longitudinal section through the side of the lower end of the rectum.

A Description of Plate.—Fig. I. X, X'. The lowermost *plica transversalis recti*, one of a series of inefaceable transverse folds that are present in the rectum, with considerable variation as to their number and distinctness in different individuals. These folds are arranged one beyond the other alternately on the left and right sides of the rectum and are analogous to the transverse folds that characterize the colon, showing that the rectum, like the colon, is sacculated. *a.* The short and narrow anastomoses between the dilated portion of the internal hæmorrhoidal veins above and the dilated portion of the external hæmorrhoidal veins below. *e.* Dilated external hæmorrhoidal veins. *g.* The sulcus, or groove, that encircles the anal orifice. Just above are to be seen the *columnæ* and *lacunæ* of Morgagni. *i. s.* Internal sphincter. *e. s.* External sphincter.

Fig. II. 1. Skin. 2. External sphincter. 3. Levator ani. 4. Longitudinal muscular fibres. 5. Circular muscular fibres terminating in the internal sphincter. 6. Internal hæm-



Haemorrhoids. (J. W. Otis.)
American Journal of the Medical Sciences.

orrhoidal veins in the submucosa. 7. Mucous membrane. 8. One or more papillæ are often seen on the bases of the columns; this is due to the fact that the papillary layer of the external skin extends for a short distance above the groove on to the columns, while in the lacunæ between the columns the follicles of the mucous membrane are present as low down as the groove. 9. The *ano-rectal* groove, which is produced by the distension of the internal veins just above it and the external veins just below it. In the dead body, where the veins are empty, the groove will not be apparent. 10. Dilated portion of an external hæmorrhoidal vein.

Otis classifies the cutaneous variety of external pile as redundant, hyperplastic, or hypertrophic. The distinctive feature of the redundant pile is the superabundance of the anal integument brought about by the stretching it receives from the subjacent varicose external hæmorrhoidal veins when they are fully distended, as during defecation. The hyperplastic pile appears in the form of a pendulous cutaneous tag, associated with an abrasion, fissure, or ulceration of the anal verge, and is the result of an inflammatory hyperplasia; while the term hypertrophic indicates that the swollen, thickened, radiating anal folds associated with the eczematous inflammation are the result of an inflammatory or irritative hypertrophy. There should be no difficulty in distinguishing between external and prolapsed internal piles, because the external pile, being covered with skin, will have the color of the skin and will be dry, with no tendency to bleed.

The main object of his contribution is to emphasize the important fact, in the etiology and pathology of external piles, that certain pre-existing abnormal conditions are indicated whenever such piles are found.

Whitehead's Operation.—The controversy regarding the comparative value of the different operative procedures still continues. M. Borts, of Cleveland, O., ²²²_{Feb., '95} regards Whitehead's operation as an ideal one in certain cases. It is only indicated, however, where the entire, or nearly the entire, circumference of the pile-bearing portion of the rectum is involved. It is rather an heroic operation, and one not likely to be undertaken unless the operator has had considerable surgical training. It consists in making a circular incision just within the muco-cutaneous border entirely surrounding the anus; then, by a blunt dissection, dissecting up the entire mucous membrane, including the underlying vessels, and carrying the dissection far enough above the pile-bearing portion so that, when traction is made, the healthy membrane may be brought down easily and stitched with fine sutures to the cutaneous border, after cutting off all the hæmorrhoidal portion. The success of this operation depends entirely on obtaining primary union; and great care is needed to get this. If the mucous membrane brought down is put too much on the stretch, the sutures will tear out. If the wound were infected and suppuration take place, there will be an ulcerating surface entirely surrounding

the anus; and when it heals by granulation, there is likely to be a stricture.

In the opinion of J. K. Gailey, of Detroit, ¹⁸⁵_{Oct., '96} Whitehead's operation, now modified, is equally as practical and more scientific than any other method. The objection that there may be non-union by first intention, leaving a granulating wound resulting in stricture, is not, in his opinion, as serious as it may seem, and is reduced to a minimum by H. Allingham's (Jr.) modification. After the mucous membrane has been dissected up, an aseptic gut of medium size is passed first through the skin, then through the base of the mucous-membrane flap, back through the mucous membrane again and out at the base of the skin-flap, forming a loop. As many of these are introduced as is necessary, and, when possible, each loop includes the neck of a pile. The ends are then tied sufficiently tight to stop hæmorrhage and at the same time form a stay-stitch. The mucous membrane containing the hæmorrhoids is cut off in front of the stay-stitches, and the membrane united to the skin with fine silk or gut sutures. Here we have the best conditions possible for union and good apposition of the parts, without tension. Results, so far, show that healing by first intention takes place in part, and generally throughout the whole extent of the wound. If there is partial non-union, and the skin has been protected as well during this operation as it must be in all other operations, no more serious conditions remain to be dealt with in these exceptional cases than in every case by the other methods,—namely, granulating wounds. Opinions differ as to Whitehead's operation being a tedious one and difficult to perform. When the hæmorrhoidal tumors form a continuous wing around the gut, with or without distinct lobes, or when they involve half the circumference, Gailey considers this method less tedious than any other; and when the tumors are less numerous he still operates by excision and suturing the wound, and thinks it equally as simple and easily performed as any method. In these cases it is not necessary to remove the whole hæmorrhoidal zone, but each tumor separately.

Andrews ²⁹³_{No. 3, '96} ⁸⁰_{Sept. 16} has secured the opinion of a large number of surgeons, both in this country and Europe, in regard to the disastrous results that are apt to follow Whitehead's operation. The replies include 200 cases, of which the following is a summary: Loss of the special sense by which the patient should be warned of a coming evacuation and enabled to prepare for it, 8 cases; incontinence of flatus and fæces, 23 cases; paralysis of the sphincter, 4 cases; chronic inflammation of the rectum, 1 case; failure of union of the wound by first intention, with retraction of the edges

of the wound, forming a contracting, tubular ulcer with stricture, 9 cases; other ulcers, 2 cases; irritable and painful anus, 12 cases; eversion of the mucous membrane, 4 cases; neuralgia of the pelvis and inferior extremities, 2 cases; general neurasthenia, 1 case; fatal peritonitis, 1 case; non-fatal septic results, 5 cases; *fistula in ano*, 1 case; reported as having bad results without accurate description, 127 cases. Total, 200. In another paper ¹¹⁵⁰_{Oct., '95} Andrews states that the Whitehead method has too many possible complications connected with it to ever make the operation a popular or safe procedure. Marcy, of Boston, ⁶¹_{Sept. 14, '95} believes that if, in the statistics given by Andrews, the names of the operators were mentioned, most of the disastrous results will be found to have followed the work of incompetent men. His own results have been excellent in those cases in which he had done the Whitehead operation, slightly modified by himself.

N. H. Henderson, of Chicago, ⁶¹_{Feb. 23, '95} modifies the Whitehead, or the American, operation in such a manner as to obviate secondary contraction,—so much to be feared in these procedures. After dissecting the hæmorrhoidal tissue from the sphincter, being careful not to injure the muscle at any point and carrying the dissection up as far as the hæmorrhoids extend, the loosened tissue is completely removed, the bleeding-points caught up and, if necessary, tied. The sphincter is again put on the stretch, and, before removing the speculum, a free incision made in the posterior median line to the extent of dividing all of the muscular fibres, and with the scissors each edge of the wound trimmed away so that they will not roll together and immediately unite. Having thus performed a complete section of one-half, three-fourths, or possibly an inch of the lower part of the rectum, with the sphincter laid bare and a deep wound in the posterior median line, a moderately large cotton tampon with a strong double-silk thread attached is placed within the rectum and the integument loosened a little to permit the skin to pass a little way into the anal orifice rather than to drag the gut out. By making traction on the threads attached to the tampon the bowel is caused to descend, and by packing the posterior incision with gauze its healing is prevented except by granulation. A small roll of cotton covered with gauze, to which the tampon threads are to be firmly tied, is now placed outside, thus securing equal pressure from within and without, in most cases completely approximating the edges of the bowel and the skin. In twenty-four hours there will be sufficient union to retain the parts in their proper relations, at which time the tampon is to be gently removed, the packing taken out of the wound in the sphincter, and the entire wound irrigated. The

wound in the muscle is then repacked and any dry dressing applied. If dressed daily in this manner, being careful to keep the incision packed until it has filled in by granulation, and the space between the membrane and the integument healed, as it will, either by first intention or by granulation, the result will be a normal rectum capable of performing all its functions in a normal manner. In thirty-six hours after the operation a laxative is given, followed in twelve hours by an enema, and the bowels moved daily afterward. The feature of this operation is the posterior incision, which, filling in by granulation, allows for the contraction which follows.

E. H. Trowbridge, of Worcester, Mass., ⁹⁹May 30, '95 expresses the belief that the Whitehead method is not all that was promised for it. It should be employed only in selected cases. Full and complete paralysis of the sphincter muscle is absolutely necessary. The operation is difficult, tedious, and bloody; and if non-union occur there is traction of the mucous membrane and a large, circular, granulating area left, which may be the source of sepsis. Retention of urine is also liable to exist for a week or ten days.

Clamp-and-Cautery Method.—Trowbridge, of Worcester, ⁹⁹May 30, '95 states that, in the case of the clamp-and-cautery method, none of the above-mentioned consequences or complications occur. This operation can be done (1) expeditiously and with little loss of blood; (2) the cauterized base of the pile is rendered aseptic by the cautery; (3) there is no pain following the operation; (4) retention of urine is extremely rare (he has never seen a case where the patient suffered from retention); (5) convalescence is brief and uninterrupted,—confinement in bed from three to seven days is sufficient.

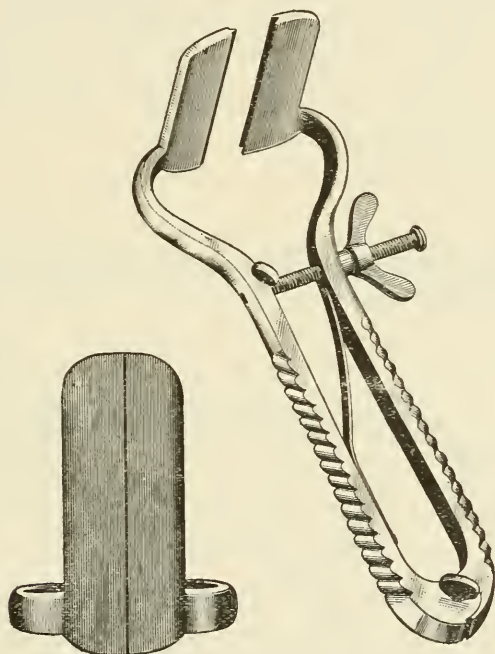
In two hundred and sixty-seven cases treated during five years at the New York Post-Graduate Hospital, Charles B. Kelsey, of New York, employed the clamp-and-cautery method, which he prefers to all other procedures. The evil results asserted by Allingham to be inseparable from this method were never encountered, while the failures to cure, which Whitehead considered as unavoidable, are still to be met with.

Haward, ⁶June 15, '95 also prefers, on the whole, the clamp and cautery. He often combines this procedure with the ligature, using the clamp for the larger masses and tying any vessels or small surfaces which bleed after its removal. In patients weakened by loss of blood he uses the ligature only. The results of both are equally good, but pain is less and recovery more rapid after the cautery. Out of 140 cases 85 were done by clamp and 55 by ligature. There were 3 deaths,—1 from anæmia, 1 from erysipelas (in a

woman aged 81 years, after ligature), and 1 in an extremely anæmic man who, a few days after the operation, developed broncho-pneumonia. He had been operated on by the combined clamp and cautery and ligature.

H. R. Colston, of Fayetteville, Tenn., ⁸¹_{Apr., '95} considers the clamp-and-cautery method preferable to all others.

J. E. Davis, of Columbus, Miss., ¹_{June 15, '95} thinks that there is a decided advantage in favor of the clamp and cautery. Rarely, after this operation, is it necessary to prescribe an opiate, and all know how seldom it is, after an operation by ligation, that we are



PARALLEL-BLADE HÆMORRHOID CLAMP. (GANT.)

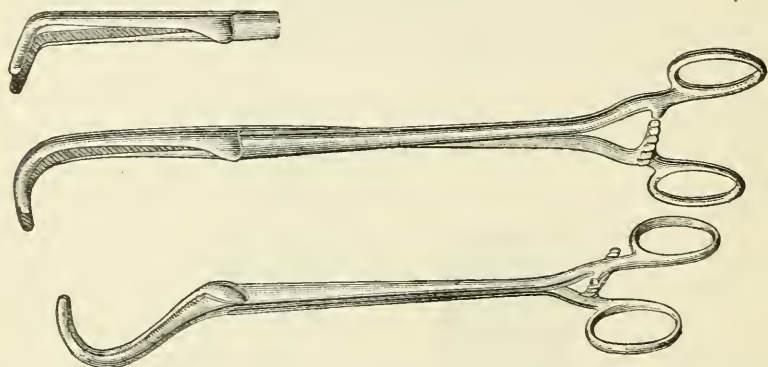
Mathews's Medical Quarterly.

not compelled to administer such remedies. The fact that patients suffer so little in comparison to the method by ligation gives to the clamp and cautery a decided preference.

Gant ¹¹⁵⁰_{Jan., '95} describes a new pile- and polypus- clamp so constructed that the blades are at right angles to the handle and always remain perfectly parallel, no matter how far apart they may be. This insures equal pressure at all points, and the tissues are held just as well near the tip as at the heel, thus giving the operator an opportunity to cauterize all points of the pedicle before it is released.

Guyon, of Paris, ²⁴_{Nov. 10, '96} presents two forceps for the ablation of soft, vascular tumors like hæmorrhoids. They are of three different forms, with an elbow either almost at right angles, a rounded elbow, or a still more rounded one, like a half-circle. There is a crane into which fits a small hook, so that the forceps may be as tightly closed as necessary. The handles with rings are very long, so as to enable their use at a great depth. They have been recommended by Farabœuf.

Miscellaneous Operative Methods.—Paul Réclus, ³_{Nov. 23, '94} ⁸⁰_{Apr. 15, '95} of Paris, in the first stage of hæmorrhoids—that of intermittence, where the attacks occur but three or four times a year and are accompanied by a slight burning sensation and pruritus of the anus, with a small flow of blood—orders gentle purgatives, applications of very warm water, enemata at the same temperature, and



FORCEPS FOR REMOVAL OF HÆMORRHOIDS AND OTHER SOFT GROWTHS. (GUYON.)

Journal de Médecine de Paris.

applications of plugs of cotton steeped in a 1-per-cent. solution of cocaine. In the second stage, where the piles are procident and the rectal varicose veins are very painful, he uses forcible dilatation, which gives unvarying success. Before employing the speculum he produces local anæsthesia of the parts in the following manner: The patient being placed in the classical position on the side, with one leg extended, the other bent on the thigh and on the abdomen, an assistant exposes the anal region. Réclus takes in a forceps a small plug of cotton, steeped in a 1-per-cent. solution of cocaine, and passes it into the rectum as high up as possible; this plug is followed by another a little larger, and yet a third and a fourth, increasing in size until he can insert one as large as a walnut. He then takes an ordinary Pravaz syringe filled with the same solution and inserts the needle into the perineum, half an inch from the anus, and injects slowly the contents, taking care to

turn the needle in different directions, and by this means one-fourth of the circle limiting the rectal orifice is anæsthetized. The injection is renewed in the second quarter, and so on until the circle is completed, each syringe containing one-fourth of a grain; it is thus that one grain of cocaine has been injected. But in order that the dilating process should be painless the sphincter must be anæsthetized, and for this purpose the operator passes the index finger of the left hand into the rectum and plunges the needle through the skin up to the muscle, guiding it with the finger; he empties half of the syringe at that point and the remainder as he is withdrawing it. Réclus has operated in this way on twenty-six patients without any accident. In the third stage, where the veins form a turgescient mass, Réclus removes them with the bistoury, without dissection of the mucous membrane and without paying much attention to the hæmorrhage. The sutures are applied in the usual way and the patient is generally well in a fortnight.

Merrill Ricketts, of Cincinnati, ¹¹⁵⁰_{Oct., '96} describes a new operation for hæmorrhoids and prolapsed rectum. The sphincter is widely dilated with the fingers, under surgical anæsthesia. A long semi-circular needle is then passed subcutaneously from the mucocutaneous juncture over the upper border of the hæmorrhoidal area and down and out at the point of entrance. The needle is now removed and the silk ligature drawn tight about the venous plexus, the ends being left hanging out to come away of themselves. The same process is used for the other principal varices, applying the ligatures every half-inch or inch according to the condition. Prolapse of the rectum is treated in the same manner, except that more ligatures are required and the needle is inserted somewhat more deeply.

Greko⁵⁸⁶_{Aug. 8, '95}ff has carefully studied the treatment of hæmorrhoids by dilatation. Having anæsthetized the patient, he introduces into the rectum a speculum covered with glycerin, separating the valves progressively as soon as the instrument has been introduced its full length. He thus gradually distends the rectum to the maximum for a period of two minutes, then irrigates the intestine with a 7 to 1000 salt solution, insufflates iodoform powder, and removes the speculum, being careful not to approximate the valves completely, for fear of pinching the mucous membrane. He uses Trélat's large speculum. From its employment in one hundred and five cases Grekoff concludes that divulsion requires no special instruments except the speculum, and may, therefore, be practiced by physicians who are not in a position to be only surgeons. There is scarcely any hæmorrhage; the post-

operative period is very short; there is no pain, fever, or other complications so frequently observed after other operations, while the number of recurrences is smaller.

H. Gotard, of Warsaw, ⁵²⁰_{No. 49, '94}; ²⁶_{Feb. 1, '95} relates the following extraordinary case. A well-nourished and generally healthy man, aged 24 years, was admitted to a local hospital on account of slightly bleeding external and internal hæmorrhoids of twelve years' standing accompanied by very painful anal fissures. The patient being brought under the influence of chloroform, the piles were ligatured and the anal orifice forcibly dilated, after which the parts were washed out with a 1 to 3000 solution of corrosive sublimate and an aseptic iodoform dressing applied. On the fifth day he was given a tablespoonful of castor-oil, with the result that an abundant defecation ensued. During the first five days the young man's condition remained quite satisfactory, but on the sixth trismus appeared, and in the next two days the typical manifestations of severe tetanus, accompanied by a rise of temperature to 105° F. (40.8° C.), profuse perspiration, and steadily increasing prostration. In spite of all efforts the patient grew worse and died on the ninth day after operation. A post-mortem examination was refused.

According to G. Roux, of Lausanne, ¹¹⁶_{Mar., '95}; ²²_{Mar. 27} an excellent method of treating hæmorrhoids consists in dilatation of the anus, followed by injections of a solution of glycerin and carbolic acid—50 to 80 per cent.—into the tumors.

The patient, chloroformed or not, is placed in the position for lithotomy. The operator introduces his two thumbs into the anus, which he dilates gradually until the fingers touch the ischion on each side, and by which means the tumors are rendered prominent. Into each of these, while compressing the base between the thumb and forefinger, he injects two drops of the prepared solution. The needle of the syringe is inserted from without inward, so as to avoid the hæmorrhage which might take place if inserted from the rectal side. A few seconds after the operation the tumor swells up and assumes a bluish color. A piece of iodoform gauze coated with vaselin and boric acid is placed *in situ* and maintained by a T-bandage. The pain resulting from the operation is insignificant. The next day the hæmorrhoids are found to be hard, but not painful, and in a few days they contract and disappear. Rest of one or two days in bed completes the treatment.

Beck, ¹⁵⁴_{Nov. 1, '94}; ²⁶⁷_{Jan. 15, '95} having noticed the rapid retrogression of cystic tumors, etc., when injected with iodoform dissolved in ether, was induced to try its effects on eight cases of hæmorrhoids, and the results were excellent. The following is his method:—

The rectum having been rendered thoroughly aseptic by

repeated irrigations with a solution of salicylic acid, a suppository containing 0.10 gramme ($1\frac{3}{4}$ grains) of cocaine and 0.01 gramme ($\frac{1}{6}$ grain) of morphia is introduced about a quarter of an hour before the operation. If this fail to render the parts sufficiently anæsthetic a few drops of a 1-per-cent. solution of cocaine may be injected at different points into the mucous membrane; but this is not desirable, and rarely necessary. A tampon of iodoform gauze is now introduced rather high up by means of a small speculum, and the hæmorrhoids are brought down and exposed, but not by means of forceps. Two drops of a saturated solution of iodoform in ether are then injected into the cellular tissue surrounding each nodule. As the result of this injection cicatricial tissue forms and the perivenous tissue retracts. If the cocaine suppository above-mentioned is used the pain caused by the injection is very slight and quickly disappears. After the operation the tampon of gauze is replaced by a suppository containing 0.10 gramme ($1\frac{3}{4}$ grains) of salicylic acid, and opium and bismuth are given to keep the bowels closed. On the third day an enema is given, and a purgative by the mouth; constipation must be carefully guarded against for a few weeks. The operation does not prevent the patient from following his usual occupation. The author has never observed any bad after-effects, such as abscess, ulceration, embolism, hæmorrhage, stricture, or fistula, and in his cases the relief was permanent. If the hæmorrhoids do not completely disappear after one operation a second injection is sufficient to complete the cure.

According to F. Schmey, of Beuthen,³_{Sept. 18, '96} a simple and efficacious method of treating hæmorrhoids is to make daily applications to the tumors of a 2-per-cent. solution of nitrate of silver. Under the influence of these applications, which are not painful, the growths soon shrink up, and the anal fissures frequently accompanying them soon become cicatrized. Eight to fifteen applications were sufficient to bring about recovery in the author's cases.

The pain and irritation accompanying inflamed hæmorrhoids may be quickly relieved, according to Illinsky,^{996 80}_{Dec., '94; June 15} by the following method: After each stool, either spontaneous or provoked by the ordinary mild purgatives used in such cases, the patient should wash himself with a weak solution of bichloride,—about 6 ounces of a 1 to 10,000 solution. Immediately after this injection he should introduce a tampon of cotton impregnated with the following ointment:—

R Lanolin,	.	.	.	.	.	1½ ounces	(50 grammes).
Vaselin,	.	.	.	.	.	5 drachms	(20 grammes).
Distilled water,	.	.	.	.	.	1 fluidounce	(30 grammes).

Sig. : For external use.

These applications should be made a number of times each day.

Where patients suffer from hæmorrhoids that are inflamed or strangulated the condition is, according to J. E. Davis, of Columbus, Miss., ¹_{June 16, '96} really one of infective phlebitis, and for the time being non-surgical measures are by far the safest. All irritation of the anal region should be carefully avoided, and the bowels regulated by appropriate diet and the proper use of laxatives. Each evacuation from the bowels should be followed by an ablution of warm water, and if the piles protrude they should be anointed with plain vaselin and replaced. Large injections of cold water at 40° to 50° F. (4.4° to 10° C.), either plain or containing boric acid or antipyrin, are productive of much good in the abatement of the inflammation, congestion, and in arresting small bleedings.

In the majority of cases of internal hæmorrhoids astringent injections or ointments are not only useless, but absolutely harmful. Where the inflammation is severe or gangrene is threatened, warm applications are useful. In addition to the treatment enumerated above, some soothing topical application or ointment is nearly always indicated, especially when associated with severe pain. The parts should be washed with a little warm water and the following ointment applied:—

R Cocaine hydrochloride,	6 grains (0.39 gramme).
Aqueous extr. of opium,	20 minims (1.30 grammes).
Extr. of belladonna,	12 minims (0.78 gramme).
Populus-ointment,	1 ounce (30.00 grammes).

If deemed necessary, at bed-time the following suppository may be used:—

R Aqueous extr. of opium,	1 minim (0.065 gramme).
Iodoform,	3 grains (0.200 gramme).
M. For one suppository.	

Anal Fistula.

In discussing the etiology of anal fistula Jos. M. Mathews, of Louisville, ¹¹⁵⁰_{Apr., '96} states that not only does a local destruction of tissue take place, followed perhaps by septic infection or by the passage of the streptococci, but we have the special microbe, the tubercle bacillus, to deal with. This view is so pronounced in his mind that in every case that presents, where it is possible to remove all the tissue, he practices this method, and invariably with success, as far as the mitigation of the disease is concerned. The great distribution of lymph-channels contiguous to the rectum readily accounts for the necessity of this procedure. Even if the ravages have been so great that all of the tubercular tissue cannot be removed, he gives free drainage to the discharge and stops local distress. In his experience, wounds upon the tuberculous patient

heal much more kindly and with more rapidity, if carefully watched, than is supposed. When the edges are flabby and fall into the wound, Mathews trims them off freely for two reasons: first, that they might not impede the healing process; second, because they are infected with bacilli. A clear wound is obtained, the whole surface of which he cures freely with a heavy instrument until the bottom has been reached to healthy tissue all around, when he dresses the wound with iodoform gauze, cotton, and a bandage. The nurse irrigates constantly, while he operates, with a solution of bichloride of mercury 1 to 5000. Care should be taken not to confine the patient to bed any longer than is absolutely necessary. If the wounds are slow to heal he dresses them daily with iodoform gauze saturated with compound tincture of benzoin.

J. B. Bacon, of Chicago, ¹¹⁵⁰_{Apr., '95} emphatically states that palliative measures should only be used for a short time, when, if the tract have not healed, radical measures for laying it open must be taken. Long-continued suppuration always tends to amyloid degeneration of the viscera, with general constitutional disturbances. As to the operation, he recalls some of the more important points to be observed: 1. The sphincters should never be severed at more than one place at the same operation, otherwise incontinence is sure to follow. 2. Unless all the channels are followed up and laid open, the operation will fail of its purpose. Fistula resulting from tubercular abscess must not be operated upon if there is sufficient tissue destruction of lung to produce hectic fevers, sweats, etc.,—unless the fistula is causing severe painful spasms of the sphincters; then it should be divided at any stage.

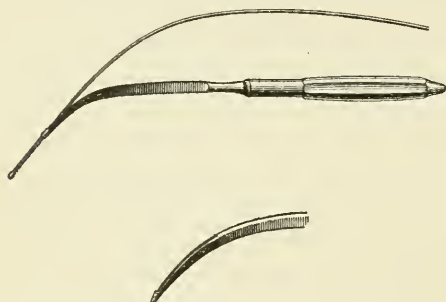
Llewelyn Eliot, of Washington, ⁸¹_{Nov., '94} says he now treats all cases with the knife or refuses to treat them at all.

George J. Cook, of Indianapolis, ¹¹⁵⁰_{Oct., '94} uses a modification of the knife-and-scissors method of treating *fistula in ano*, as proposed by Frederick Lange. It consists of opening the fistulous tract and cutting out the indurated tissue surrounding it, thus converting it into a simple, healthy wound, and then bringing together the raw surfaces with sutures.

In a case of pilonidal fistula H. M. Page, of Hiram, O., ⁵⁹_{Sept. 23, '96} demonstrated the existing channel between the two openings by the injection of peroxide of hydrogen, which procedure is, to his mind, much more satisfactory than the use of the probe, which so often is made to demonstrate fistulæ and sinuses which exist only in the mind of the operator. He refers to cases reported by Warren, Wyeth, Ashhurst, himself, and other surgeons in which it was proven that every sinus in the neighborhood of the anus is not necessarily a *fistula in ano*, but may be connected with caries

or necrosis of the tuber ischii, or may depend upon the pressure of a tuft of hair. He made a free incision connecting the two openings, and was rewarded by bringing to the surface a tuft of perhaps a hundred hairs. Curettement and the application of pure carbolic acid secured an early termination to this rather unusual case, which he supposes must be explained as resulting from the invagination of epithelial cells during the embryonic development of the individual.

Walker, of Detroit,¹¹⁵⁰_{Oct., '94} states that the difficulty of introducing a groove-director or a silver probe when operating for *fistula in ano* has led him to present the tunneled fistulatome illustrated in the cut. For several years, when failing with the groove-director in introducing a filiform bougie through the fistulous tract, he used it as a guide in making the operation, and in order to further simplify it he has added a tunneled end to a large-sized curved bistoury.



TUNNELED FISTULATOME. (WALKER.)
Matheus's Medical Quarterly.

Anal Fissure.

Chéron, of Paris,¹⁴_{June 23, '95} in the treatment of anal fissure, has had excellent results from the following method: Having opened the anus and located the site of the fissure, a small cotton tampon, soaked with a 1 to 20 or even 1 to 10

solution of cocaine, is applied. At the end of five minutes local anæsthesia is complete and the fissure is cauterized by letting fall on it from a dropper one or two drops of pure ichthyol. This application is repeated daily four or five times, when dilatation is performed with Nélaton's dilator and the entire surface of the fissure touched with the ichthyol. Dilatation becomes easier as cicatrization advances, and may be carried far enough to destroy the sphincteric contraction which complicates many old cases of fissure. For recent fissure ten sittings are sufficient, but twenty may be required for cases of long standing.

Van der Willigen³³⁶_{May 4, '95} reports four cases of fissure of the anus in which healing took place speedily under the application of pure ichthyol. The drug was applied every morning and evening, also after each defecation, by means of a pencil introduced into the anus and rubbed into the parts with a little pressure.

E. Quénu,⁵⁵_{Jan. 26, '95} from an experimental study of dilatation of

the anus, concludes that this procedure acts by producing reflex atony of the sphincters, and that in anal fissure its chief rôle is to cause disappearance of contraction of the sphincters.

Imperforate Rectum and Anus.

Commandeur,⁸²⁷_{Dec.12,'94} in describing a case of rectal imperforation operated on by a modification of the sacro-perineal method, states that, in some instances, although the *cul-de-sac* is situated somewhat high up, it is separated from the superficial planes by a fibrous sheath, which prevents it from being discovered. In such cases Fochier advises ordinary incision of the perineum and resection of the coccyx and, if necessary, part of the sacrum. If, instead of the ampulla, a fibrous layer is found, this, as well as the peritoneum, should be incised transversely, the ampulla sought for and drawn out to the cutaneous wound, suturing the edges of the peritoneal incision to the peritoneum of the rectum, opening the rectum and suturing its mucous membrane to the skin.

In a case of atresia ani urethralis, in which an attempt was made to reach the rectum through the perineum, F. C. Scotson, of Manchester,⁶_{Mar.9,'95} could find no bowel, and, therefore, closed the perineal opening and opened the abdomen in the usual situation for the performance of inguinal colotomy. On introducing the finger into the abdominal cavity the rectum was found narrowed to a calibre very considerably below the normal and passing toward the neck of the bladder. A suitable part of the sigmoid flexure, which was of normal size, was sutured to the lips of the incision and at once opened. Three hours afterward the bowels discharged their contents freely through the artificial anus. The child progressed almost uniformly favorably, a slight blush of cutaneous inflammation, due to the irritation of escaping feces, persisting round the artificial anus for about a fortnight. Six weeks after the operation the infant suffered from a short attack of enteritis. At the time of writing there was a slight protrusion of intestine at the seat of the colotomy, but in all other respects the infant is in the best of health.

Kirmisson, of Paris,⁶⁷_{Nov.30,'95} uses the Dieffenbach-Nélaton method in vulvar ectopia of the anus in women. He liberates the rectal ampulla from its attachments, sutures it to the orifice created in the perineum, and leaves the abnormal recto-vulvar orifice to close of itself. He prefers this method to Giraldes's operation in two stages,—by transplantation of the rectal ampulla and vulvar autoplasty. In vaginal ectopia he recommends a trial of Nélaton's method or that of Martin, of Lyons,—incision of the perineum from vulva to coccyx and reconstitution of the vulvar pocket. If

the defect is situated high up and there is no rectal ampulla an iliac anus must be established as a last resource.

J. R. Hester, of Prospect Hill, N. C., ⁴³Feb. 5, '95 observed a case of imperforate anus in which, during the first few days after the birth of the child, the contents of both bladder and bowel were passed through the urethra at the same time. When about 1 week old it began to pass the urine and fæces separately, the urethra, however, still acting as the passage-way for both. Some months later, at the time of report, the child continued to do fairly well, the bowels acting twice daily, on an average, and the bladder about as frequently as in other children of the same age.

Owen ²²May 29, '95 performed inguinal colotomy on a male infant with a well-formed anus

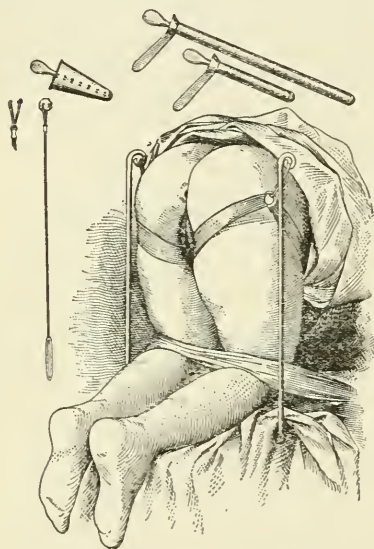


FIG. 1.—NEW METHOD OF EXAMINATION OF THE RECTUM. (KELLY.)

Annals of Surgery.

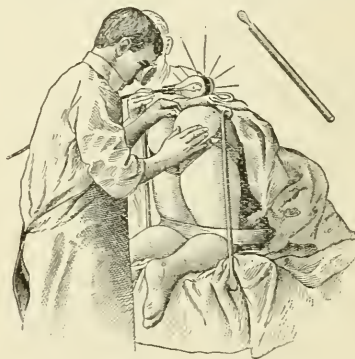


FIG. 2.—SIGMOIDOSCOPY. (KELLY.)

and anal *cul-de-sac*, but with imperforation of the septum between the hypoblastic and epiblastic portions of the rectum.

Anæsthetics in Recto-Anal Surgery.

When cocaine was first beginning to be used as a local anæsthetic several accidents occurred, and these have deterred many from employing it. The fatalities were due to two errors,—the use of solutions of too great strength and the injection of the drug directly into veins. By using a 1-per-cent. solution and making the injection slowly and moving the needle-point steadily all the time the injection is being made, Ricards ¹⁰⁰Feb. 14, '95 finds that cocaine may safely be used for such operations as stretching the sphincter and the removal of piles.

New Instruments.

Otto Ramsay, of Baltimore, ¹¹⁵⁰_{Apr., '95} describes a new method of examining the rectum and sigmoid flexure used at the clinic of Howard A. Kelly. The instruments are, first, a sphincteroscope four centimetres long; second, a proctoscope fifteen centimetres long; third, a proctoscope twenty centimetres long; fourth, a sigmoidoscope thirty-five centimetres long. These instruments are provided with obturators to facilitate their introduction into the

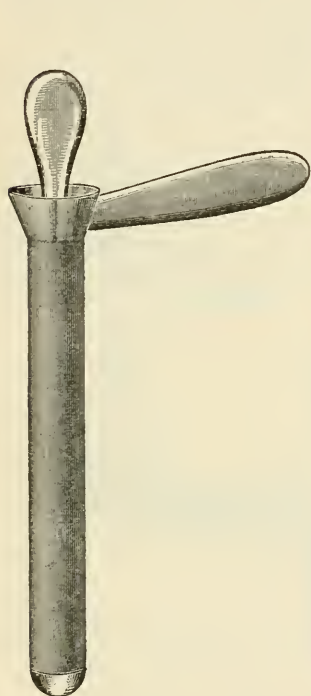


FIG. 3.



FIG. 4.

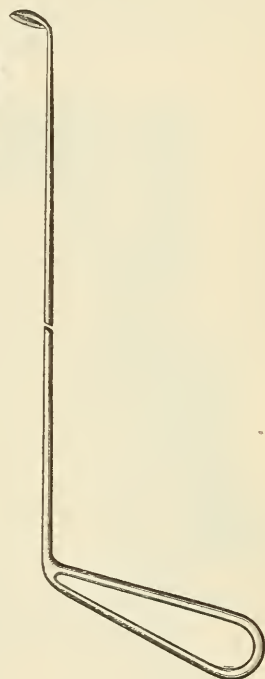


FIG. 5.

INSTRUMENTS IN USE FOR EXAMINATION OF THE RECTUM. (KELLY.)

Fig. 3. Long proctoscope for examining the upper rectum. Fig. 4. Sigmoidoscope for examining the sigmoid flexure.
Fig. 5. Scoop for removing small faecal obstructions 42 centimetres long.

Annals of Surgery.

bowel. A blunt cone is used to dilate the sphincter for the introduction of the larger specula; applicators of copper wire, a sponge-holder, and a small, long-handled scoop for removing faecal matter complete the outfit. The patient is placed in the knee-breast posture; the speculum, with obturator in place, is inserted with a slight, boring, rotary motion; the obturator is withdrawn, and the wall of the bowel can be readily examined as it collapses about the end of the speculum as the instrument is withdrawn. Applications can be made at any point. An anæsthetic is not

necessary. The bowels and bladder should be empty before the examination is made. Kelly ⁹⁶_{Apr., '95} states that, by means of this method of examination, he has plainly seen and sounded a stricture of the bowel fourteen centimetres (five and one-half inches) above the anus. He has also recently seen a polypus not more than five millimetres in diameter, ten centimetres (four inches) above the anus, and he has had occasion to examine cases diagnosed and treated for years as colitis in which he found the rectum the seat of a chronic inflammatory trouble limited either above or below the promontory by a perfectly sound mucosa.

The accompanying cuts illustrate the steps of the method:—

Fig. 1 shows the posture of patient for proctoscopy and sigmoidoscopy. Under anæsthesia the pelvis is suspended and the knees held up as shown. The

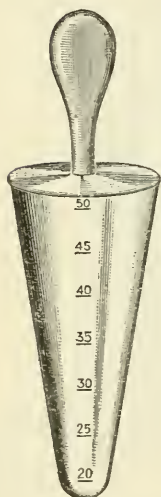


FIG. 6.



FIG. 7.

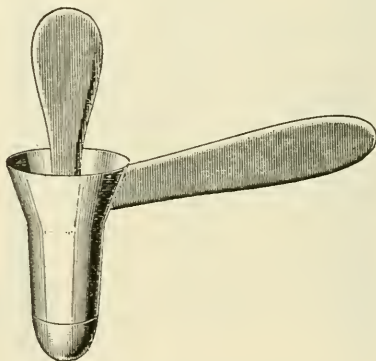


FIG. 8.

INSTRUMENTS IN USE FOR EXAMINATION OF THE RECTUM. (KELLY.)

Fig. 6. Conical Sphincter dilator. Fig. 7. Copper-wire cotton-applicator 42 centimetres long. Fig. 8. Sigmoidoscope.

Annals of Surgery.

proctoscope and sigmoidoscope are illustrated, reduced in the cut on exactly the same scale as the patient's body; the sigmoidoscope is therefore about as long as the thigh. The rectal dilator and applicator are shown to the left, reduced in the same way.

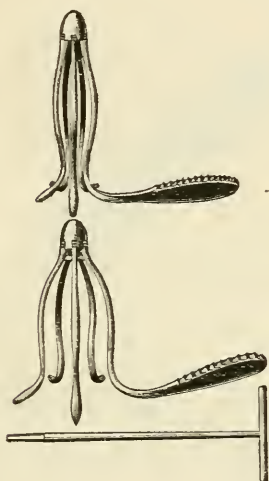
The instrument seen above to the right in Fig. 2 is introduced down to the very end, as seen in the cut, which is taken from a photograph. The electric light held over the sacrum is reflected by the head-mirror to the bottom of the tube, giving a perfect picture of the bowel at the other end.

In Fig. 3 the cylinder is 20 centimetres by 22 millimetres. Obturator is in place in the speculum. A short proctoscope cylinder, 14 centimetres by 22 millimetres, is used for examining the ampulla and lower rectum.

In Fig. 4 the cylinder is 35 centimetres by 22 millimetres. The detachable handle is seen above to the right. The obturator is in place in the speculum.

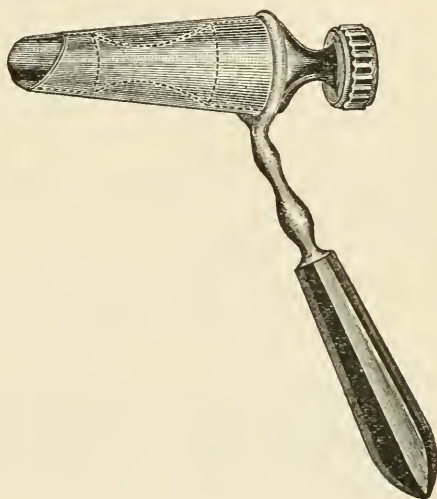
In Fig. 6 the diameters of the various parts are indicated in millimetres.

In Fig. 8 the cylinder is 4 centimetres long, and its diameter at the upper part is 3 centimetres and the lower end 2.5 centi-



DILATABLE RECTAL SPECULUM.
(RYALL.)

British Medical Journal.



IMPROVED CONICAL RECTAL SPECULUM.
(R. W. MARTIN.)

Medical Record.

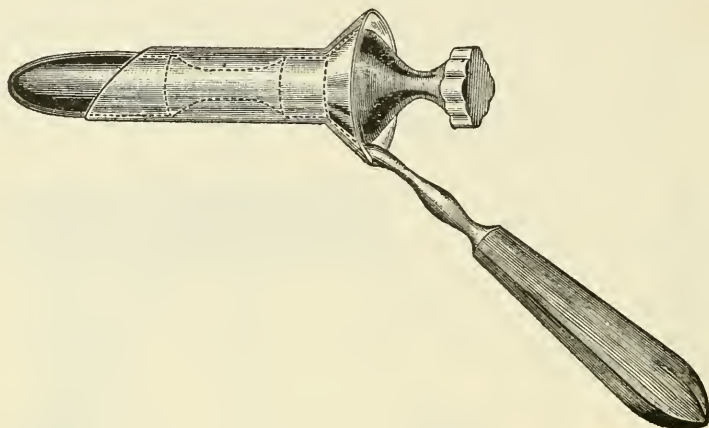
metres. The flange is 5 centimetres in its greatest diameter. The obturator is in place.

The rectal speculum illustrated in the accompanying cut is one presented by E. C. Ryall, of London, ^{June 15, '95} who claims for it the following advantages: (1) it keeps the rectal wall well stretched, and so prevents the mucous coat from falling between the blades of the speculum; (2) it presents a good field for inspection; (3) it allows a large surface for the application of the cautery or other reagents; (4) it can be readily dilated to any extent required and easily kept clean. ²⁰⁷⁴_{'95}

An important conical rectal speculum was contributed by R. W. Martin, of Philadelphia, ⁵⁹_{Sept. 15, '94} the model of which is shown in the annexed cut. It represents a symmetrical cone, truncated at a

small angle, so that the obturator may fall into position without the trouble and delay of adjusting it to some particular line or mark on the base of the cone. The outer end of the obturator is supplied with a milled head of large diameter to facilitate its removal.

The recto-sigmoid speculum described by T. L. Adams, also



RECTO-SIGMOID SPECULUM. (T. L. ADAMS.)

Medical Record.

of Philadelphia, ⁵⁹_{Feb. 9, '95} is a modification of the above with a view of increasing the field of vision. To obviate the increased difficulty of introduction caused by a larger obturator the latter was made conical instead of cylindrical and lengthened.

SURGICAL DISEASES OF THE GENITO-URINARY APPARATUS IN THE MALE.

BY E. L. KEYES, M.D., AND EUGENE FULLER, M.D.,

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NEW YORK.

General Considerations.

Posner and Lewin, of Berlin, ⁴_{No. 22, '95} study the question of how germs enter and infect the urinary tract in cases where no catheter or instrument has ever been employed. They find that, when cystitis or pyelitis exists, the germ causing the inflammation is usually the bacterium coli commune; and they show that this organism can and does enter the blood-current wherever free and natural evacuation of the bowels does not occur, and that, when the germ is once in the blood-current, it is eliminated from the system through the medium of the kidneys and the urinary tract. They also demonstrate that the peritoneal fluid always remains sterile, thus proving that the infection of the urinary tract does not take place by reason of the bowel germs penetrating directly through the intestinal and bladder walls. The authors, however, do not exclude the possibility of infection directly through the vesical walls. When germs enter the urinary tract through the medium of the kidneys they are able to cause infection only in those cases which offer facilities for germ proliferation. Stagnation of urine or constant irritation, such as is present in cases of neoplasm, stone, etc., are conditions which favor this proliferation.

Bazy, of Paris, ³⁶⁰_{June, '95} reports a case of glycosuria in which death followed speedily after the passage of a sound employed to search for vesical calculus. A few hours after the passage of the instrument the patient had a chill. Periurethral phlegmon and sloughing of the scrotum then occurred, followed by general sepsis. The author emphasizes the fact that glycosuria may cause localized urinary symptoms, and points out the dangers of vesical instrumentation in these cases.

Grosplik, ⁶¹_{May 25, '95} in an article on the prophylaxis of cystitis from catheterization, summarizes as follows the experimental researches of Rovsing and Guyon: 1. The introduction of instruments into the bladder ought to be made under the most rigorous aseptic

rules, in order to prevent the penetration of germs from the exterior into the bladder. 2. The use of hard metallic instruments should be avoided as far as possible, for they may produce lesions of the vesical mucous membrane and thus favor microbic infection from the urethra; it is advisable to use Nélaton's catheter; metallic instruments only in cases of necessity. 3. If there be retention the urine should be evacuated slowly and progressively; a sudden rapid emptying of the bladder may cause hyperæmia of the mucous membrane, thus considerably favoring inoculation. 4. These manipulations should be repeated at intervals not exceeding six hours; with re-establishment of the vesical functions the intervals may be lengthened. 5. In all retention, even if transient, catheterization is to be repeated if the first be not followed by a spontaneous evacuation within six hours. 6. If for any reason the systematic evacuation of the bladder, as pointed out in 4, cannot be carried out, we must use the catheter *à demeure*, which may be left in over night, or constantly, according to circumstances.

Eugene Fuller, of New York, ⁴⁶²_{Mar., '95} in an article on the receptivity of the urinary tract to germ infection, reviews much of the recent literature of the subject and cites several illustrative cases, in one of which death occurred from an ascending bacillary nephritis resulting from the single passage of a catheter, in an elderly individual, to determine if residual urine existed. None being found, however, the bladder was washed with a light antiseptic. Before the catheter was introduced an examination had shown the urine to be normal.

A. J. McCosh, of New York, ⁹⁶_{Feb., '95} reports a fatal case of peritonitis in a male subject in which the source of the abdominal inflammation was supposed to be a periprostatic suppuration. The abdominal cavity contained much plastic purulent lymph. In commenting on the bacteriology the author states that had a bacteriological examination been made in more of these cases the track of the infection could be determined with greater accuracy. It seems to be still an open question whether or not the gonococcus alone is capable of exciting a septic inflammation of the peritoneum. In the only two cases in which the author can find reports of bacteriological examinations there was positive evidence of a mixed infection; in his own case staphylococci and streptococci were abundant, while in the case of Challan de Belval micrococci and other bacteria were found. Where the pyogenic bacteria are present it is proof that a secondary infection has occurred, most probably from the rectum, and in such cases the evidences point to suppuration of the connective tissue of the pelvis as the cause of the peritonitis. On the other hand, could it be determined

that the gonococcus was the only bacterium present the probabilities would favor infection along either the spermatic cord, vesiculæ seminales, or, possibly, bladder.

[In the great majority of these cases the gonococcus extending into the seminal vesicle sets up an acute seminal vesiculitis associated with an extensive perivesiculitis, and this inflammatory focus becomes secondarily infected from the rectum or possibly from the bladder in case that viscus be a seat of infection.—E. F.]

M. Routier ³¹_{July 17, '95} reports a case of suppurative epididymitis occurring during the course of a gonorrhœa in which gonococci were found in the pus escaping from an incision made into the epididymis. Before demonstrating the presence of the gonococcus the author had supposed the testicular inflammation to be tubercular.

PENIS.

Hypospadias and Epispadias.

Englisch, of Vienna, ¹⁴_{Feb. 13, '95} presented a case of hypospadias extending to the scrotum, in which there also existed a complete cleft between the corpora cavernosa, the apex of which was two centimetres beyond the corona. When an erection occurred the lateral ends of the organ separated, forming, as it were, two prongs.

Laurent, of Brussels, ⁵²_{June 29, '95} reports a case of hypospadias in a boy $9\frac{1}{2}$ years old which he rectified in the following manner: Two oblique parallel cuts, ten centimetres apart, were made on inner side of the right thigh, extending upward and outward, involving the abdominal region. These incisions were deep enough to cut through the true skin. The skin between the cuts was then dissected free, the two ends of the parallel strip being left undisturbed. The lateral borders of the defective urethral wall were then dissected free and sutured together in the median line. After this had been accomplished the penis was slipped under the flap of skin dissected free from the thigh, its under denuded surface being turned up and fastened to the under fleshy surface of the thigh-strip. After union had taken place the amount of the thigh-flap necessary to form the under surface of the urethra was cut free and the penis liberated.

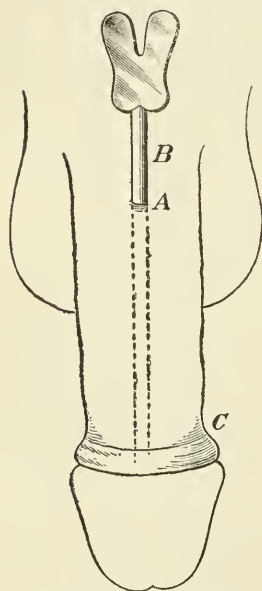
G. H. Makins, of London, ⁶_{Nov. 17, '94} also describes very fully a case of hypospadias upon which he successfully operated by Thiersch's method.

Pozzi ¹⁴_{June 30, '95} reports a case of epispadias in which he was able to build up the defect in the urethra by adopting the method of Thiersch. The operation required three *séances*.

Phimosis.

W. L. Roberts ⁶_{Dec. 8, '94} records a case of phimosis sufficient to cause retention of urine and secondary cystitis associated with pyonephrosis. S. A. Miller, of Birmingham, Ala., ⁸⁶_{Oct., '94} also records an aggravated instance of this condition in which the pouch, formed by the phimosis when distended after urination, looked very much like the external female genitals. After micturition the patient, in this instance, had to squeeze the urine out of this pouch through a pin-hole opening.

R. M. Woodward, of the United States Marine-Hospital Service, ¹_{Feb. 23, '95} reports a clever operation for



OPERATION FOR RELIEVING
PHIMOSIS WITHOUT INFECTING
THE WOUND. (WOODWARD.)

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relieving phimosis without infecting the wound when that condition complicates gonorrhœa or chancreoid. The operation in detail is as follows: 1. Shave the pubes, penis, and scrotum. 2. Thoroughly scrub the parts with a solution of bichloride of mercury, 1 to 2000. 3. Compress the glans penis, forcing the blood out, and dexterously slip back the prepuce over the corona glandis, converting the phimosis into a paraphimosis. 4. Cleanse the glans and prepuce well with the same antiseptic solution, and have an assistant hold the glans wrapped in cotton wet with bichloride. 5. Place a rubber band about the penis at the level of B, near the base. 6. Inject a 4-per-cent. solution of cocaine subcutaneously, entering the needle just back of A and passing it down to and under the constriction at C, slowly injecting the solution during withdrawal. 7. Pick up the skin at A

with two forceps and snip with scissors. 8. Withdraw the foreskin to its fullest extent, bringing the constriction (junction of mucous and cutaneous surfaces) about a quarter or half an inch back of the corona glandis. 9. Introduce subcutaneously a grooved director at A, and pass down beneath the constriction. 10. Upon the director pass a tenotome flatwise until the constriction is reached, then turn the cutting edge up and gently sever the constricting band without cutting through the mucous membrane or skin. 11. Withdraw the instruments, remove the rubber band, check the few drops of blood that appear, take one or two fine catgut stitches in the wound, and close it

with cotton and collodion, to prevent the absorption of any poison that may afterward touch it. 12. Lay one thickness of iodoform gauze over the glans, again compress it, and draw down the prepuce to its former position.

J. W. Ross, of Suwanee, Tenn., ⁵⁹_{Aug. 31, '95} suggests, in performing circumcision, that the glans penis be inserted up to the corona into the open mouth of a glass test-tube; then that the foreskin be drawn down over the tube and fastened there by a circular ligature, after which arrangement a cut can be made just below the circular ligature, removing the prepuce.

Denucé, of Bordeaux, ¹⁸⁸_{Oct. 21, '94} argues in favor of the association of hernia and hydrocele with congenital phimosis, and quotes the statistics and opinion of Jarjavay, Fleury, Schmidt, Karewsky, and others in support of his tenets. He thinks that removal of the phimosis will often be followed by a natural cure of an associated hydrocele or hernia.

Tumors of the Penis.

Cancer.—Buday ²²⁶_{B. 49, H. 1, '94} reports two cases of epithelioma of the penis presenting interesting features. One originated from the inner layer of the prepuce and had cystic as well as adenomatous characteristics in connection with its epithelial structure. The other, apparently originating from the neighborhood of the fossa navicularis, produced such thickening of the entire penis that a condition of elephantiasis was simulated. Numerous urinary penile fistulæ eventually formed. Examination of the growth showed it to be a papillomatous epithelioma.

Edward Martin, of Philadelphia, ²⁴⁵_{Mar., '95} reports a case of epithelioma originating on the inner surface of the prepuce, and considers the etiology and treatment of penile cancer. The condition of phimosis is acknowledged to be a strong predisposing factor. Direct contagion seems to be the cause in some instances. The evidence that syphilis can exert a causative influence is not very strong. It is advised that when amputation of the penis is required the inguinal glands on both sides should be dissected out, even though they are not appreciably enlarged.

W. N. Wishard, of Indianapolis, ¹_{Aug. 31, '95} at the meeting of the American Association of Genito-Urinary Surgeons, reported three very instructive operative cases of epithelioma. In two of the cases amputation had been done close to the scrotum. In the other the corpora cavernosa and the testes had been removed entirely, a small scrotal pouch being left to serve in the event of any subsequent necessity for plastic work. The mucous membrane of the urethra had been stitched in the perineum to the margin of the

skin. In all these cases the disease had advanced far back toward the scrotum at the time of the operation, but in neither of them had the inguinal glands been involved. The first patient had been operated on eight years ago, recurrence had taken place a year and a half later at the point of amputation, and the patient had soon afterward died. The second patient had been operated on over four years ago, and the third six months ago, but in neither of these were there any signs of recurrence.

[It seems that removal, in cases of progressive epithelioma, of all the erectile penile structures, including the crura of the corpora cavernosa and bulbous structure of the corpus spongiosum, as well as scrotum and testicles, is most important. The results of Wishard not only show this, but also show that such a removal of the penile and sexual structures is fully as important as the removal of the inguinal glands, and perhaps more so in case those lymphatics do not give clinical evidences of involvement.—E. F.]

Chalot, of Toulouse, ²⁶⁶_{Nov., '94} reports a case of radical operation for cancer of the penis in which he removed all the erectile structures, the scrotum and its contents, and the lymphatic glands from both groins.

Enchondroma.—Tuffier and Claude, of Paris, ²⁶⁶_{Dec., '94} report a case of hard induration of the right corpus cavernosum causing numerous subjective symptoms. The mass, upon being dissected out, proved to be an enchondroma. A good result, with relief of symptoms, followed the operation.

Miscellaneous Disorders of the Penis.

Mechanical Retention of Urine.—Henry Morris, of London, ⁶_{Sept. 14, '95} reports two rare and interesting cases in both of which retention of urine resulted from tumefaction of the erectile structures of the penis. In the first case temporary retention was caused by the formation of an hæmatoma in the left corpus cavernosum. The hæmatoma was occasioned by straining in connection with a heavy weight. In the second case there existed a consolidation in nodular form of the corpora cavernosa and corpus spongiosum, resulting in painful and difficult micturition and occasional retention of urine and constant priapism. The cause for this induration was unknown. The patient finally died in spite of perineal drainage, having previously become insane. In commenting on these cases Morris states that these two cases, from their great rarity, seem worthy of being placed on record. The first—intra-cavernous hæmorrhage resulting from a strain—is interesting on account of its causing painful micturition and afterward complete retention of urine. This was doubtless due to the

direct pressure upon and deflection of the course of the urethra which the blood, extravasating into and stretching the corpus cavernosum, produced. The condition cleared up after a short period of rest in bed and the occasional use of the catheter. The second case was altogether of a different character, though there was much the same effect produced upon micturition. Neither simple gonorrhoeal or syphilitic inflammation nor injury, gout, tubercle, or gummata was the cause of this disease. Neither was it an instance of calcification of the sheath and septum of the corpora cavernosa nor of the cicatricial contraction after inflammation or gummata. In the absence of a microscopical examination of the deposit Morris is unable to classify it. Its course was more like multiple malignant neoplasms. The chief symptoms were the nodular masses, which gradually coalesced and which, at length, resulted in a condition of priapism or, at any rate, of chronic thickening and stiffening of the organ, which resembled nearly complete erection. Associated with these physical changes in the organ were the pain in the penis and urethra, which at last became constant, and the difficulty in micturition. The superficial sloughing of the glans penis is also noteworthy. As to treatment, nothing did the patient any good so far as diminishing the induration of the erectile tissues of the penis; the *bouttonnière* relieved the bladder, but made no change otherwise. The pain in the penis and the terrible mental distress, sleeplessness, and excitement remained unabated by it. He has no doubt that the insanity which supervened was the direct effect of these causes. In the absence of a post-mortem examination he offers no explanation of the cause of death, which took place after the patient had left his hands. Should a similar case, equally untractable to local and internal remedies, come under his care, he should certainly propose to freely lay open the diseased parts and, if necessary, amputate the penis at its connection with the pubes.

Tuberculosis.—Wickham⁴¹⁵_{Apr., '95} reports a case of tuberculosis of the prepuce. The lesion started seven years previously as a small nodule. Some months before it had ulcerated, and since that time the ulcerative process had extended quite rapidly. The diagnosis had been verified by bacteriological study.

Nobl, of Vienna,²²_{Aug. 28, '95} reports an interesting case of probable tubercular infiltration of the corpus cavernosum.

Sloughing and Necrosis.—Ramon Guiteras, of New York,¹_{Apr. 27, '95} reports a case of sloughing of a portion of the dorsum of the penis due to septic absorption in connection with an abundant growth of subpreputial warts.

Volterra⁵⁷_{Sept. 23, '94} and Pousson and Courtin⁹⁹⁶_{June 28, '95} report cases of

gangrene of the penis. In Volterra's case streptococcal infection existed.

URETHRA.

Gonorrhœa.

Pathology.—Henry Heiman, of New York, ⁵⁹_{June 22, '95} after a careful and thorough clinical and bacteriological study of the gonococcus as found in the male urethra and in the vulvo-vaginal tract of children, concludes that the gonococcus (Neisser) is never present in the normal urethra, as far as his experiments have shown. The diplococci found in the normal urethra can positively be differentiated by the Gram stain. He believes that the diplococcus described by Turro in connection with his acid-media experiments is not the gonococcus. He indorses Wertheim's conclusions, except that he believes the liquid sterilized chest serum to be a better culture-medium in every way than placenta serum. Urine agar is not an ideal culture-medium, as Finger claims. Gram's stain is the only crucial staining test for the presence of the gonococcus (Neisser), and should therefore be employed in all cases. For ordinary staining of the gonococcus he recommends a 2-per-cent. alcoholic methyl-violet solution. Certain reports of the discovery of the gonococcus in various parts of the body—such as mouth, rectum, and serous cavities—must be looked upon with skepticism, owing to the fact that Gram's stain and culture-media were not applied. The normal vulvo-vaginal tract is never a habitat for the gonococcus, as far as his experiments have demonstrated. Gram's stain is here also the differential stain between the diplococci found in pus-cells from the diseased vulvo-vaginal tract. There is reason to believe that there is a specific micro-organism in catarrhal colpitis, either the diplococcus of Bockhart or of E. Fränkel. In specific colpitis the gonococcus found is identical with the one found in specific male urethritis. His inoculation experiments on the human urethra confirm the belief in the specific pathogenic power of the gonococcus (Neisser).

Diagnosis.—Coullion, of Montluçon, ¹⁰⁰_{June 22, '95} considers at considerable length inflammation of the bulbous urethra, and concludes that this portion of the urethra is susceptible of becoming the exclusive seat of an inflammation which may infiltrate the surrounding tissues, thus causing a perineal abscess.

H. Goldenberg, of New York, ²⁴⁵_{Dec., '94} in an article on posterior urethritis and the diagnostic value of the modified Thompson test, disagrees with Lohmstein (see ANNUAL of 1895), and asserts that that test, which bases the diagnosis of posterior urethritis on

the existence of shreds in the urine passed directly after irrigation of the anterior urethra, is reliable, provided the urethra has been just previously washed out by his (Goldenberg's) method. The reason Lohnstein found it inaccurate was probably because that investigator used a catheter introduced well into the bulbous urethra, and also perhaps interfered with the outflow of the irrigating fluid by compressing the meatus. In employing this test Goldenberg states that the irrigation, as he now practices it, is done by means of a short hard-rubber or glass tube, which is attached to the irrigator. This tube is introduced up to the fossa navicularis or farther and withdrawn a short distance; this manœuvre slightly distends the urethra at the time; the meatus is, however, not kept closed. The manipulation can be easily carried out in a few minutes; so that it may even be employed in dispensary practice. The irrigation, not being painful, can safely be practiced in acute cases; but he admits that in gonorrhœa of a few days' duration it is not absolutely necessary to irrigate the urethra for diagnostic purposes.

Trekaki, of Alexandria, ¹⁴_{Nov. 7, '94} in five cases of acute uncomplicated gonorrhœa, has noted the bodily temperature night and morning with the following results: In more than half the cases (60 per cent.) there existed slight fever, which ranged in the morning around 38° C. (100.4° F.) and in the evening from three- to five-tenths of a degree higher. In some cases the evening rise was 1° C. (1.8° F.). In three cases the fever mounted above 40° C. (104° F.). The duration of the febrile period was about three weeks. Nogués, of Paris, ²⁶⁶_{May, '95} endeavors to disprove these statistics of Trekaki, believing with Guyon that acute uncomplicated gonorrhœa is not accompanied with fever. He observed the temperature in connection with thirteen cases of acute gonorrhœa and found it normal except in one instance, in which an acute prostatitis existed as a complication.

Treatment.—Neisser, of Breslau, ⁴¹_{Aug. 26, '95} advocates, as a preventive against gonorrhœal infection, the injection into the urethra, after coitus, of a 2-per-cent. solution of nitrate of silver, together with cleansing of the glans and prepuce.

M. Horovitz, of Vienna, ¹⁶⁹_{Jan., '95} states that when a case of gonorrhœa is seen very early, a local application of a 10-per-cent. solution of nitrate of silver, applied through an endoscope for two successive days and then followed by an astringent injection, may speedily effect a cure. He also considers that solutions of resorcin sometimes act favorably, when used for a considerable period, by exfoliation of the mucous membrane, thus leading to an evacuation of the gonococci. Schäffer, of Munich, ³⁴_{July 9, '95} considers that a great

disadvantage in the use of nitrate of silver in gonorrhœa lies in the fact that it produces, with albumin and sodium chloride, insoluble compounds, and that for this reason it does not penetrate sufficiently into the tissues to destroy the gonococci which have buried themselves beneath the surface. From numerous experiments he found that argentamin penetrates much deeper into the tissues than nitrate of silver and at the same time is a stronger bactericide, a 1 to 4000 solution of argentamin killing gonococci more rapidly than a 1 to 4000 solution of nitrate of silver or than a 1 to 10,000 solution of corrosive sublimate. For injections into the anterior urethra he employs a 1 to 5000 or a 1 to 4000 solution of this drug; for irrigation, a 1 to 10,000 solution; and for the deep urethra 15 to 30 minims (1 to 2 cubic centimetres) of a 1 to 1000 or a 1 to 500 solution applied by means of a Guyon syringe. Albertazzi⁵⁰⁵_{July 10, '95} has also been using argentamin in gonorrhœa with success. He advocates for the anterior urethra solutions of from 1-4000 to 1-2000 and claims for it the same advantages that Schäffer does, having employed it in fifty cases with but one negative result. The secretion increases after the first few injections and then rapidly diminishes. A great improvement in the discharge is to be expected in five or six days. The period of treatment is not supposed to last over two weeks, and the injections are held to be applicable to any stage of the disease.

J. Janet, of Paris,²⁶⁶_{June, '95} in an article on the treatment of gonorrhœa, lays stress, first of all, on suppressing or exterminating the gonococcus by irrigations of permanganate-of-potassium solution; then, in order to guard against what he considers secondary infection, the glans and prepuce are kept disinfected by bathing them with strong corrosive-sublimate solutions. If secondary infection of the bladder occur before the gonococcus has been eliminated, it is necessary to make use of a combined solution of permanganate of potash and corrosive sublimate. After the gonococcus has been eliminated secondary infections are treated by solutions of corrosive sublimate and of nitrate of silver. C. Ekellund³⁷⁰_{V.57,p.56} has treated one hundred and twenty-five cases of gonorrhœa according to Janet's method and thinks well of it, but states that it should not be employed until the acute stage has subsided, that the fluid should be introduced slowly at first and gradually allowed to run at full force, and that careful attention should be paid to the strength of the irrigating fluid and its reaction on the mucous membrane. Routier, of Paris,¹¹⁵³_{Nov.10, '94} and F. C. Valentine, of New York,²⁴⁵_{June, '95} both report success from the employment of Janet's method slightly modified.

Jadassohn⁴⁵_{'96} has used argonin in the treatment of gonorrhœa

in 260 cases—72 in men and 188 women—in all stages of the disease. His experience convinces him that argonin cannot replace the other antigonorrhœal injections in every case. The indications for the use of silver nitrate, argentamin, and argonin, respectively, have yet to be formulated. His conclusions as to the last named are: (1) 1.5- to 2-per-cent. solutions exert a rapidly destructive action upon gonococci; (2) strong solutions are devoid of inflammatory or corrosive action, and hence are adapted to the treatment of acute gonorrhœa of the anterior and posterior urethra in men and of the urethra and uterus in women; (3) it appears to lack astringent properties, so that purely anticatarrhal treatment will indicate the assistance of other remedies.

H. M. Christian, of Philadelphia, ⁶⁰_{Nov. 15, '94} has used corrosive sublimate, silver nitrate, potassium permanganate, and trikresol for daily irrigation of the urethra. The amount of warm (not hot) liquid used was one quart (litre), the reservoir being at a height of six feet, the patient standing. The duration of the treatment was two, exceptionally three, weeks. He concludes: 1. That irrigation is a distinct advance in the treatment of gonorrhœa; in fact, up to a certain point, it must be considered the proper treatment for that disease. It relieves ardor urinæ and chordee more promptly than any other form of treatment. It is attended with a much smaller proportion of complications, such as total urethritis and epididymitis. 2. That permanganate of potassium is the best remedy for the purpose of urethral irrigation. 3. That irrigation of the urethra alone cannot be relied upon to absolutely cure specific urethritis. For the cure of the thin muco-purulent discharge which appears at the meatus in the morning, some astringent injection used by the patient himself is necessary. 4. That simple non-infectious urethritis can be cured, in from ten to twelve days, by daily irrigations with permanganate of potassium.

Pellissier, of Roumania, ⁶⁷_{Dec. 15, '94} approves of the employment of citric acid in the treatment of gonorrhœa, and believes that injections of 1 part of citric acid in 100 of water, given six times a day, will cure the disease in eight days. For irrigations he uses once a day a solution of 8 parts in 1000 and looks for a cure in two weeks or so. P. Jaesohn, of Washington, D. C., ⁵⁹_{Sept. 7, '95} and A. Rose, of New York, ⁵⁹_{Sept. 21, '95} think well of alkaline injections in gonorrhœa.

The following authors have contributed general articles on the treatment of gonorrhœa: Petrini Galatz, of Bucharest ³⁵_{Sept. 7, '95}; H. M. Christian, of Philadelphia ⁸⁰_{Sept. 16, '95}; Phélip, ²¹¹_{July 21, Aug. 11, 18, '95} and F. A. Lyons, ⁵⁹_{May 4, '95}

Complications.—Hewes, of Boston, ⁹⁹_{Nov. 22, '94} reports some interesting bacteriological experiments undertaken in connection with

gonorrhœal rheumatism. He took blood from five individuals, all suffering from gonorrhœal rheumatism and all having gonococci in their urethral discharges. From these specimens of blood cultures were made, the acid-gelatin media of Turro being employed. In three negative results were obtained, but in the other two there resulted colonies of bacteria having the characteristics of the gonococcus. The culture from one of these cases, upon being inoculated into the vagina of a bitch, set up in thirty-six hours a redness, which was followed by the characteristic discharge. In this case, also, the diplococci resulting from the fourth generation of cultures produced like inflammatory results in the vagina of a second bitch.

Balzer and Lacour ²⁶⁶_{Dec., '94} report a case of gonorrhœa complicated, shortly after its commencement, by a very severe form of infectious purpura. There was also hæmorrhagic cystitis, epistaxis, and hæmatemesis, associated with violent gastro-intestinal disturbances. Bacterial examinations demonstrated the presence of the gonococcus in the urethra, and cultures taken from the urethral secretions and from the blood both showed the white staphylococcus. The patient recovered, and, with convalescence, the staphylococcus disappeared. These results showed the complex nature of the infection.

Stricture.

J. P. Tuttle, of New York, ¹_{Apr. 13, '95} recommends extreme local dilatation in the treatment of urethral stricture. To accomplish it he makes use of his urethral dilator,—an instrument which he presented to the profession several years ago, and which embodies the same general principles as the Oberländer instrument. A very gradual dilatation has given him best results, and he seldom increases the distension more than two or three millimetres at a *séance*, these being from three to ten days apart. In irritable patients, when the sittings must be far apart, the course of treatment is considerably prolonged.

[It is thus seen that the dilator is intended to replace the use of sounds in cases of stricture, and is not supposed to be a divulsor.—E. F.]

A. Pearce Gould, of London, ²²_{Dec. 19, '94} for fibrous stricture requiring external urethrotomy, advocates tying into the urethra a large-sized catheter after the stricture has been cut, and then suturing about the catheter the divided borders of the urethra. He also unites the perineal wound by means of several rows of sutures. The catheter is removed at the end of four days, at which time it is expected that primary union of the divided structures has taken

place. The author maintains that better results follow this method than the ordinary one of allowing the perineal wound to heal by granulation, since in the former instance less cicatrization results.

Chas. Audrey, ¹⁰⁸⁸_{Oct. 21, '94} has successfully treated penile stricture by dividing it longitudinally and then suturing together each lateral edge folded on itself, thus applying to urethral stricture the method which Heinecke adopted for stricture of the pylorus.

F. Leguen, of Paris, ²⁶⁶_{Apr., '95} reports three cases of impassable stricture in the treatment of which he successfully resorted to retrograde catheterization. E. Loumeau, of Bordeaux, ¹⁸⁴_{Sept. 23, '94} also reports a similar case successfully treated by the same method, in which the suprapubic vesical wound was closed at the time of the operation.

J. E. Summers, of Omaha, ¹⁰⁶_{Dec., '94} successfully adopted this measure for perineal stricture associated with extravasation of urine into the perineum, and O. Horwitz, of Philadelphia, ¹⁴⁴_{July, '95} employed it with success for rupture of the urethra and extensive urinary extravasation. P. Mendes, of Brazil, ²⁶⁶_{Sept., '95} also reports a case.

Rollet, of Lyons, ¹⁴_{Apr. 21, '95} and Poullain, of Lyons, ¹¹⁵³_{Mar. 16, '95} both advocate suprapubic cystotomy associated with temporary vesical drainage as a primary procedure in the treatment of some forms of urethral stricture associated with infection, and, secondarily, after the infective condition has subsided, whatever radical operation the stricture may require.

Syphilitic Stricture.—Albarran, of Paris, ³_{Oct. 31, '94} in a lecture on syphilitic stricture of the urethra, divides such lesions into two classes,—transitory, resulting from localized infiltrations, and permanent, resulting from cicatrization following destructive lesions. Strictures of the first class are cured by treatment directed toward the general disease, while those of the second class are unaffected by it.

Traumatic Stricture.—G. Chismore, of San Francisco, ¹_{Aug. 31, '95} reports a case of traumatic penile stricture occurring in a man of 42 years, which he successfully treated by resection of the urethra. At the age of 6 years the patient, in order to avoid constantly wetting the bed at night, for which he had often been punished, had tied a string about the penis near the scrotum. The constriction thus produced had entirely severed the urethra and corpus spongiosum and divided fully half of the corpora cavernosa; so that, on bending the penis upward, the severed ends of the urethra had been over an inch apart. Two attempts had been made in Germany to restore the urethra by a plastic operation, but both had failed. Several months ago he had come under the care of Chismore, who first made a perineal section through which the

urine had been allowed to flow, and then denuded the tissues of the old wound, precisely as was done in attempting to close an old torn perineum. The two ends of the urethra were then cut off squarely, a staff introduced, and the severed portions of the corpora cavernosa closely drawn together by means of a deep line of buried catgut sutures, accurate approximation of the lower surface of the urethra being thus obtained. No attempt was made to suture the upper, or deeper, half of the urethra, owing to the difficulty of accurately adjusting the stitches. The corpus spongiosum was closely sutured and the integument then brought together. On the second day after the operation the man had an attack of delirium tremens. On the thirteenth day the catheter was removed and the perineal incision permitted to close. The man then passed his urine entirely through the normal urethra, the severed ends of which were united so closely that the introduction of a bulbous sound failed to reveal the line of union. Since the operation the man has had erections without pain. Pousson, of Bordeaux,¹⁴ July 21, '95 also reports a successful excision of two centimetres of the penile urethra, the seat of a dense fibrous stricture which had retracted after several preceding urethrotomies.

Von Dittel, of Vienna,³³⁶ Sept. 21, '95 reports two instances of traumatic perineal stricture treated by perineal section and the introduction between the healthy urethral ends (the strictured area having been excised) of a skin-flap turned in from the border of the perineal wound. In the first case a narrow fistula persisted, but in the second firm healing of the perineum resulted, and in both cases a pervious urethra was obtained.

E. Hurry Fenwick, of London,² Nov. 17, '94 showed a patient who had had traumatic rupture of the prostatic-membranous urethra, caused by his being buried while excavating. Twelve hours after the accident a suprapubic incision into the cavity of Retzius evacuated an immense quantity of blood, and it was then found that the bladder had not been ruptured, but that the prostatic-membranous urethra had been torn nearly across and that the hæmorrhage proceeded from an extensive laceration of the plexus of Santorini.

Fistula.—H. Allingham, of London,²² Mar. 6, '95 operated on a boy, aged about 15 years, who, some years previously, had been operated on for stone and had been left with a large recto-urethral fistula, so that all the urine passed into the rectum and was constantly running away through the gut. Many operations had been attempted to cure this condition, but without avail. The author separated the anterior part of the rectum from the prostatic urethra and base of the bladder by getting into the cellular septum between

these two organs, so as to allow of the rectum being well drawn down; lateral incisions were also made into the skin; in fact, a modification of Lawson Tait's flap-splitting operation was employed. By these means the opening in the urethra was quite separated from the opening in the rectum, thus preventing any further chance of the urine finding its way into the rectum. Deep perineal stitches were next inserted, a catheter being also passed from the penis into the bladder and tied in. The operation resulted in a cure.

F. Tilden Brown, of New York, ²⁴⁵_{Feb., '95} in a case of urethro-rectal fistula complicated by urethral stricture, operated as follows: A perineal opening was first made, after which the opening in the rectum was closed. This was accomplished with considerable difficulty, as the tissues surrounding the fistulous opening had become so much thinned that it appeared very doubtful whether the sutures would hold. After closing the opening the mucous membrane of the rectal wall was dissected up and brought down over the line of sutures like an apron, so as to act as a temporary shield. A large perineal tube was then inserted and the bowels confined. On account of the great loss of tissue sustained during the previous operations the final outcome of the operation was regarded as very dubious; but the rectal fistula closed entirely, and the patient made a perfectly good recovery.

Double Urethra.

J. Englisch, of Vienna, ⁵⁷_{Nov. 1, '94} on two occasions has observed this rare anomaly, a canal extending above the normal urethra from the dorsal surface of the glans to the pubic region. Examination has shown the abnormal canal to be lined by a pavement epithelium and to be surrounded by cavernous tissue. The writer remarks that if an individual with such an anomaly should become infected with gonorrhœa the ordinary methods of treatment would be ineffectual, and in order to eradicate the disease the extra canal would have to be slit up and cauterized.

G. Martin ²⁴³_{Jan., '95} reports a peculiar malformation in which there existed double urethræ together with congenital penile fistulæ.

Cancer of the Urethra.

Albarran, of Paris ¹⁰⁰_{Nov. 15, '95}; P. Rupprecht, of Dresden ³³⁶_{Nov. 17, '94}; Bazy, of Paris, ¹⁰⁰_{July 25, '95} and Eugene Fuller, of New York, ²⁴⁵_{Apr., '95} all report instances of cancer of the urethra. When Albarran reported his case, but seven others of primary cancer of the urethra had been recorded in medical literature. From a study of his own and of the reported cases he describes this condition as occurring

most frequently (though not in his case) in the subjects of gonorrhœal stricture, at an age varying from 43 to 72 years. It consists of a pavement-celled epithelioma, springing from the epithelium of the mucous membrane and perhaps from the glands, its favorite site being in the scrotal and perineal portions of the canal. Starting originally in the interior of the canal, which it contracts, the neoplasm afterward invades the urethra, destroys it, extends to the surrounding tissues, and forms a bulky tumor in which fistulæ open. These fistulæ are mostly due to urinary infection, superadded to the neoplasm, some to a progressive destruction of the invaded tissues, and have almost always been mistaken for simple gonorrhœal strictures complicated with abscess and fistulæ. In

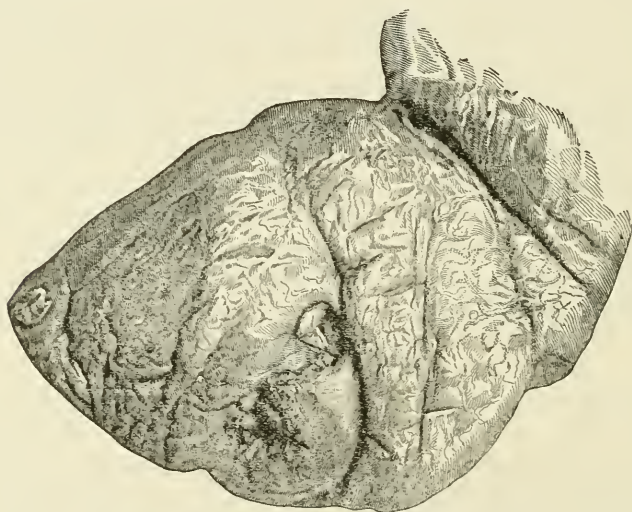


FIG. 1.—CANCER OF THE URETHRA. (FULLER.)

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certain cases there is an absence of gonorrhœa and urethral trauma, but abundant urethral hæmorrhage may occur either spontaneously or by exploration of the urethra with soft instruments. Some of the fistulæ are much ulcerated and present an unusual appearance. Microscopical examination of the discharge which comes from the fistulæ is of great importance, for often epithelial cells are found to be abundant. Fragments of the tumor may be removed for histological investigation, and the examination of the glands in the groin may help the diagnosis considerably.

Albarran and Bazy both treated their cases by practicing complete emasculation. In Albarran's case enough of the deep urethra was left to allow of urination by way of the perineum. In

Bazy's case none of the urethra was left, the urine being drained off through an hypogastric fistula.

Fuller's specimen was obtained post-mortem, and was one of villous cancer originating in the urethral mucous membrane, taken from an old man whose death was hastened, if not directly caused, by retention of urine due to the plugging of the canal by the growth.

Fig. 1 represents a side-view of the distal portion of the organ. Fig. 2 represents the internal appearance of the growth, an incision having been made from the meatus along the frænum and floor of the urethra, which allowed the sides of the organ to

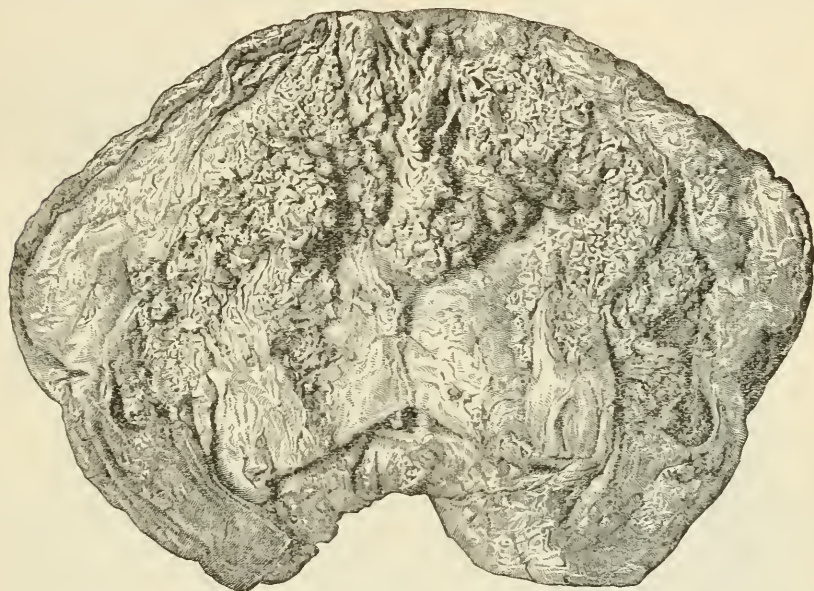


FIG. 2.—CANCER OF THE URETHRA. (FULLER.)

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be spread apart, thus exposing the urethra. In the glans penis there were four sinuses connecting with the urethra. Three of these can be seen in Fig. 1; the fourth was on the right side of the glans, and, consequently, does not appear in the illustration. All these sinuses were largely filled with the growth. The one, however, just above the meatus and the meatus itself were so corked by the villous mass as to be water-tight. In studying this specimen, the early history of which is unfortunately somewhat meager, it is evident that the growth first of all filled up the fossa navicularis, thus shutting off the urine from its natural vent,—the meatus. At the same time the soft cancer destroyed the firm urethral tissues,

thus allowing the pent-up urine to infiltrate and finally to discharge itself from a sinus which, in turn, was itself choked up by the encroaching growth, only to be replaced by another a little farther removed from the centre of infection, and so on, until at length the patient died.

A. T. Cabot, of Boston, ¹_{Aug. 31, '95} and G. A. Syme, of Melbourne, ²⁸⁵_{May 20, '95} both report instances of cancerous involvement of the perineal urethra in which the disease originated either in the deep urethra or from the adjacent glandular structures. In both these cases there had been a previous history of gonorrhœa, and in Syme's case there had also been, a year previously, a perineal traumatism.

Urethroscopy.

H. R. Wossidlo, of Berlin, ⁵⁹_{Sept. 7, '95} describes the Nitze-Oberlænder urethroscope, together with the modifications suggested by Kollmann and Heynemann. The endoscopic tubes are made of

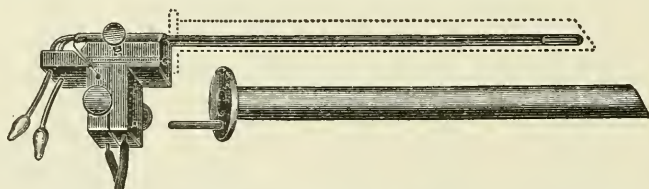


FIG. 1.—THE NITZE-OBERLÆNDER URETHROSCOPE, MODIFIED BY C. G. HEYNEMANN. (WOSSIDLO.)

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silver, which produces the least disturbing reflexes, and is most durable and useful. The tubes have a calibre of 23, 25, 27, 29, and 31 Fil. Charrière. Oberlænder and Kollmann, of Leipzig, have shown the advisability of employing large-sized urethral tubes. Their use quickly convinces one that they rest quite loosely in the urethra.

The only difficulty in introducing large tubes may be experienced at the external orifice or at the valve of Guérin, which, when present, is situated at the end of the fossa navicularis. In the cavernous portion and at the bulb the urethral canal is naturally wide and can, in relatively many cases, easily be passed by tubes of calibre 31 Charrière. The lining membrane of the urethra being longitudinally folded, it is desirable that these folds be smoothed out during examination, and this requires large-sized tubes. The extra-urethral rim of the tube has a spur to which the light-carrier can be affixed. The light-carrier consists of two wires which conduct the electric current to platinum wire, the one

being insulated, the other not. They rest upon a tunneled bar, through which cold water circulates. The slender and delicate handle has two screws for connecting the wires of the light-carrier with the conducting wires of the galvanic battery. The tunnel for the circulating water is connected by an India-rubber tube with an irrigator, which, filled with cold water, is fixed at about three feet above the apparatus, either to the wall of the room or by an iron bar rising from the apparatus. From this irrigator the water runs through the rubber tube into the tunnel underneath the platinum wire; another tube conducts the water from the light-carrier to a hard-rubber or tin box, into which it finally drips. On closing the galvanic current the platinum wire becomes incandescent, producing a strong electric light. The heat of this glowing wire is cooled by the cold water circulating in the tunnels beneath it. The light-producer may either be an accumulator or a chromic-acid battery.

A rheostat enables the operator to control the strength of the current. Under the supervision of Kollmann, of Leipzig, Heynemann modified Nitze's original urethroscope. These alterations have made it more easily manageable, with easier employment of other instruments through it, such as probes, urethrotomes, etc.

For easy introduction the urethral tube is armed with an obturator. The obturators for the anterior urethra are straight;

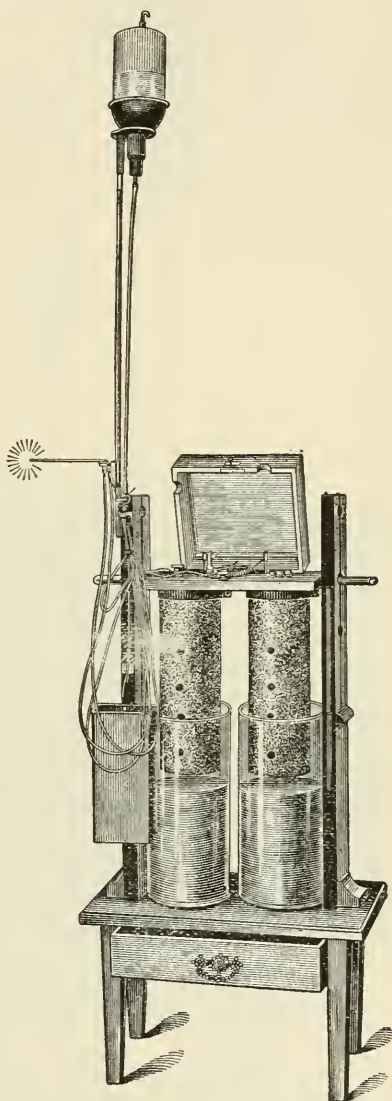


FIG. 2.—OBERLENDER'S ELECTRO URETHROSCOPICAL APPARATUS, CHROMIC-ACID BATTERY, COOLING DEVICE, AND URETHROSCOPE. (WOSSIDLO.)

Medical Record.

those for the posterior urethra have a joint by which they can be made to assume the shape of the Mercier catheter (Figs. 5 and 6).

Oberländer also designed a dilating tube with two blades (Fig. 7). For the purpose of probing the urethral glands an endoscopic sound is used (Fig. 8). Another instrument is a capillary aspirator for removing such thin liquid as may be found in the urethral canal (Fig. 9). For the purpose of removing mucus or pus from the glands a spatula has been constructed (Fig. 10).

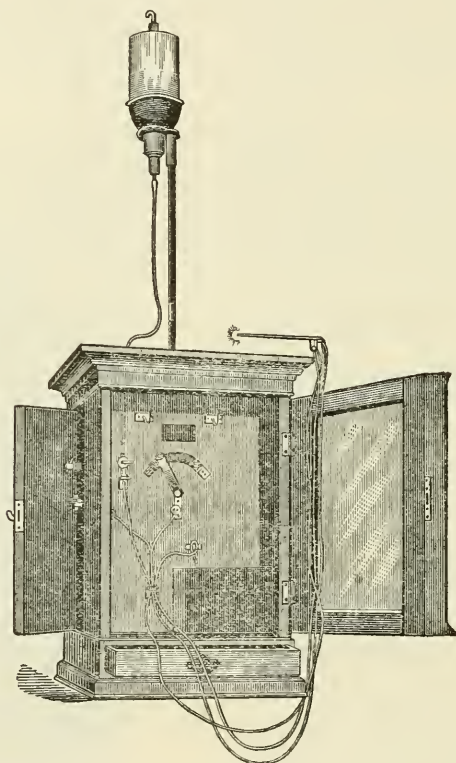


FIG. 3.—ELECTRO-URETHROSCOPICAL APPARATUS, WITH ACCUMULATOR. (WOSSIDLO.)

Medical Record.

Of the instruments used for endoscopic treatment are: (a) the endoscopic knife, designed for making small incisions into the glands or infiltrations (Fig. 11); (b) the endoscopic cannula armed with a syringe for injections into the urethral glands or other orifices (Fig. 12); (c) a urethral forceps for the removal of foreign bodies and for the treatment of urethral tumors (Fig. 13); (d) an electrolytic sound for destroying such diseased glands as will not yield to other treatment (Fig. 14).

All these instruments can be used through the endoscopic tube while the electric light permits of supervising the field of operation.

While urethroscopy is simple enough, its technique merits somewhat detailed attention. Before introducing the tube into the urethra every part of the apparatus should be tested, to be assured that it is in working order. The water must be in circulation through the soft-rubber tubes and through the light-carrier. This being the case, the rheostat must be turned on until the platinum wire becomes sufficiently incandescent to give a good white light and no farther, lest the wire be burned through. Should this happen to the novice the rheostat must be turned back to reduce the galvanic current. Then, pressing the two ends of the platinum wire together with a pair of forceps, they will be reunited by turning on the rheostat sufficiently, only until the platinum wire becomes of a red heat.

A thorough examination of the urethra naturally depends upon the neat adjustment of all parts of the apparatus. Of these, the platinum wire, whose incandescence furnishes the light, requires that its ends, which are inserted into the light-carrier, be not loose, but rest firmly in their sockets. Should

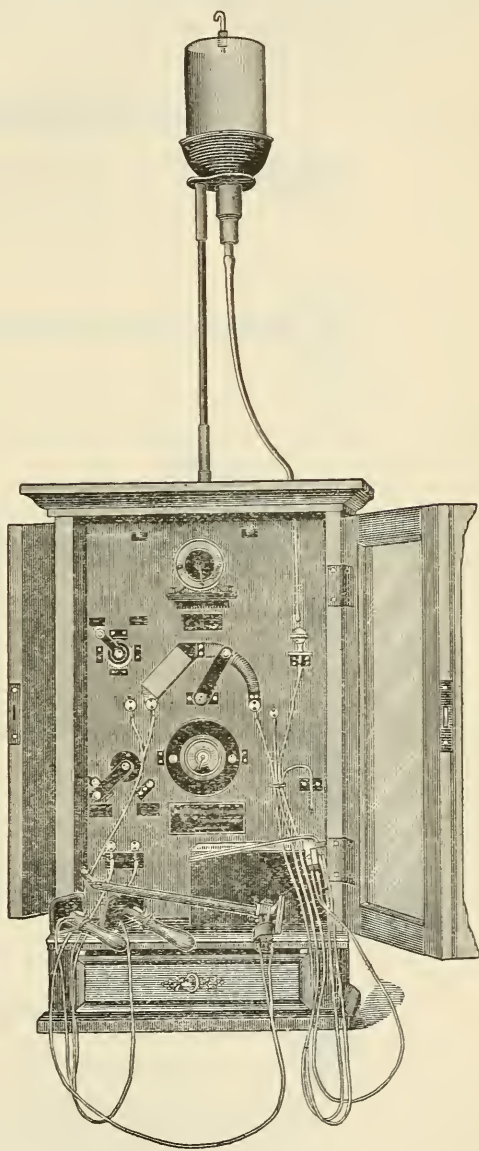


FIG. 4.—COMBINATION APPARATUS FOR URETHROSCOPY, CYSTOSCOPY, CONSTANT CURRENT, AND ELECTROLYSIS. (WOSSIDLO.)

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carelessness allow such a condition to prevail, the light will flicker and go out. The same disturbance can be produced by any defect in the battery or the conducting wires. The platinum may

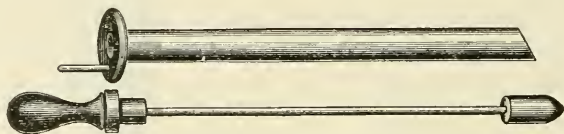


Fig. 5. Urethral tube and obturator.



Fig. 6. Jointed obturator for posterior urethroscopy.



Fig. 7. Dilating tube with two blades.

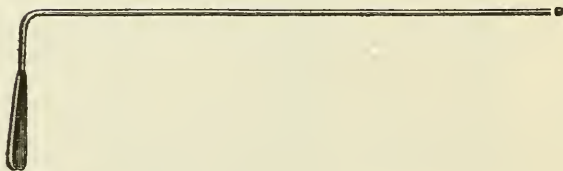


Fig. 8. Kollmann's endoscopical sound.

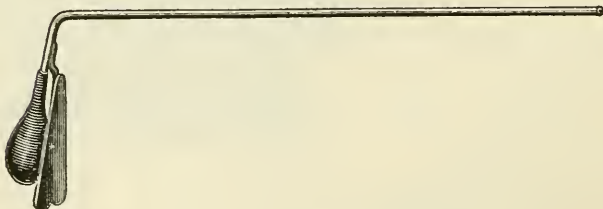


Fig. 9. Kollmann's capillary aspirator.

INSTRUMENTS USED IN URETHROSCOPY. (WOSSIDLO.)

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occasionally be pressed down upon the light-carrier; this will prevent it giving a good light. In such an event the defect can easily be remedied by raising the wire from contact with a bit of stiff paper drawn beneath the wire and the plate.

E. Hurry Fenwick, of London, ^{July 20, '95} has had made an operating aëro-urethroscope, and states that heretofore instruments of

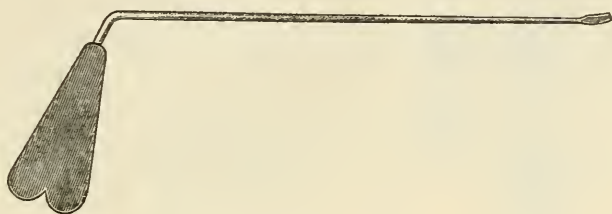


Fig. 10. Kollmann's spatula.

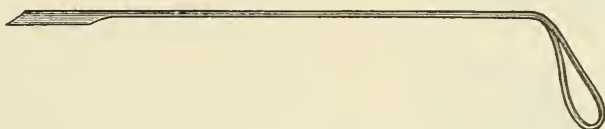


Fig. 11. Kollmann's intra-urethral knife.

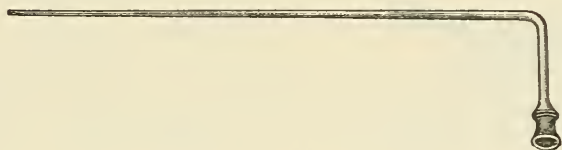


Fig. 12. Kollmann's endoscopic cannula for injections into urethral glands.

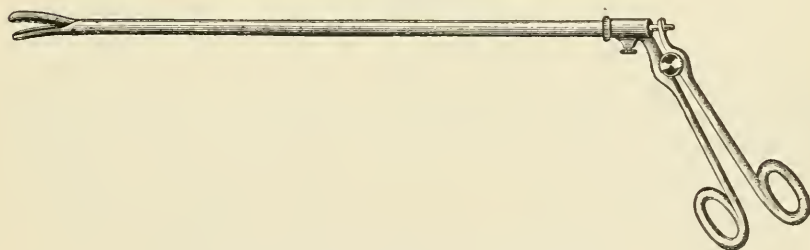


Fig. 13. Dittel's intra-urethral forceps, modified by Kollmann.

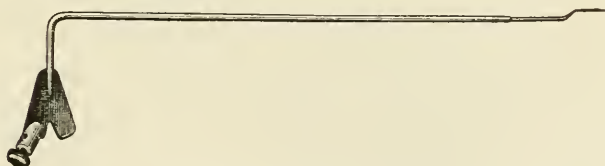
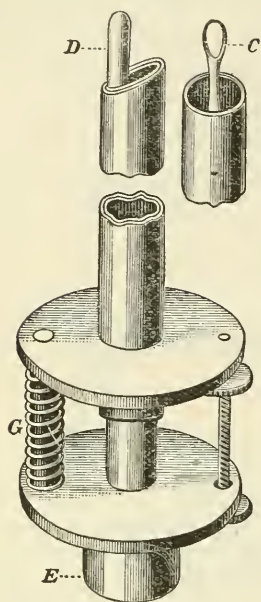


Fig. 14. Kollmann's electrolytic sound.

INSTRUMENTS USED IN URETHROSCOPY. (WOSSIDLO.)
Medical Record.

this nature, although affording a good view of the interior of the urethra, have been, nevertheless, useless for operating purposes.

His instrument consists of an ordinary urethral cannula, inside of which is another movable tube,—“the instrument carrier.” The end of this inner tube is armed either with a knife (*D*), curette (*C*), or brush. It can be projected from the cannula by pressing on the shield (*E*). Directly the pressure is taken off it springs back under cover through the action of a spring (*G*).



AËRO-URETHROSCOPE. (FENWICK.)
British Medical Journal.

H. G. Klotz,¹_{Jan. 26, '95} of New York, records the histories of many cases treated by means of his endoscopical apparatus.

Casper and Lohmstein,⁶⁹_{Nov. 22, '94} favor an instrument into which the rays of light are reflected; and F. C. Valentine, of New York,⁵⁹_{Aug. 3, '95} presents an article on the same subject.

SCROTUM.

Phlegmonous Processes.

C. D. Spivak, of Philadelphia,⁶⁷³_{May, '95} reports an instance of gangrene of the scrotum complicating a case of varicella in a boy 2 years of age. Swelling of the scrotum occurred two days after the first appearance of the eruption upon the face, and gangrene occurred three days later. The penis, the scrotum, and the left inguinal region were much swollen and very tender. The left side of the scrotum was covered by blackish, muddy-looking crusts and detritus covering about two-thirds of it and passing over the raphé to the right side. The smell was very offensive. The crusts and detritus being carefully removed, the tunica albuginea of the left testicle was exposed to view, thus showing that the gangrenous process destroyed not alone the integument, but also the dartos, the external, cremasteric, and internal fasciæ, and the tunica vaginalis.

S. K. Bremmer, of Mount Vernon, N. Y.,⁵¹_{Jan., '95} records a case of phlegmonous inflammation of the scrotum and subsequent purulent peritonitis occurring without assignable cause in an apparently healthy infant of 8 weeks.

Tumors.

A. Sheen, of England, ^{July 6, '95} reports a case in which sebaceous cysts of the scrotum attained great development, one of them, hanging from a pedicle, being as large as the scrotum itself.

F. T. Brown, of New York, ^{Jan., '95} removed a fibrocystic tumor of the scrotum fourteen and one-half inches in diameter. The multiple cysts making up the growth were filled with a clear, yellow serum. The growth did not appear to have any connection with the testis, cord, or epididymis, but seemed to spring from the dartos.

TESTICLES.

Joseph Griffiths, of Cambridge, Eng., ^{Mar. 30, Apr. 13, '95} referring to the manner in which the testicular secretion passes outward and onward in its course, states that the seminal tubules have, as is well known, no sheaths of muscular tissue to exercise a compressing influence upon them and so expel their contents, as is the case with the tubules of most other glands,—those of the prostate, for example. Moreover, the testicle itself has only a very imperfect covering of striped muscle in the form of the cremaster, which is a suspender rather than a compressor of the body of the testis. Accordingly, in the absence of any such muscular mechanism, either around the individual seminal tubules or around the whole gland, the secretion is forced out of the seminal tubules by the *vis-a-tergo* pressure under which it is produced, and as new secretion is formed the older material is forced along the tubules into the channels of the rete, thence into the vasa deferentia, and ultimately into the tubules of the upper end of the epididymis. These last have muscular walls, which, by their contraction, must drive the seminal secretion onward; and, besides, these tubules are lined by ciliated cells, which are presumably for that purpose.

[This theory is old and, in the main, very unsatisfactory. The function of the circulation of the testicular secretions may be assigned to the ampulla of Henle and the clubbed end of the vas deferens, the ampulla of Henle being connected with the cavity of the seminal vesicle by a valve-like orifice which prevents any backflow of the secretion into the ampulla after it has once been forced out of that cavity and into the vesicle. (This mechanism is explained in Fuller's work on "Disorders of the Male Sexual Organs.") The circulation of the seminal secretions are thus governed by the same general principles as that of the blood, the ampulla of Henle corresponding, in a way, to an auricle, while the seminal vesicle plays the part of a ventricle, the chief differences being that the contractions of the ampulla of Henle bear

no rhythmical relation to those of the seminal vesicle, and that the capacity of the ampulla of Henle is small compared to that of the vesicle.—E. F.]

Griffiths's observations regarding the effects of castration upon the prostate and the remaining sexual apparatus go largely to confirm the conclusions of White and Ramm. The fact is also considered that atrophy of a testicle is not to be expected after ligation or division of its vas deferens, provided the blood-vessels and the nerves supplying the organ are not disturbed. W. H. Bennett, of London, ⁶_{Apr. 20, '95} calls attention to the fact that in 1891 he reported that atrophy of a testicle did not follow division or partial removal of the corresponding cord. (See ANNUAL of 1892.)

[For several years past a number of leading surgeons have advocated the removal of those structures in tubercular conditions of the epididymis and cord requiring an operation, leaving the testicle proper undisturbed.—E. F.]

Varicocele.

Fred. C. Wallis, of London, ⁴⁵¹_{Jan., '95} believes that the subcutaneous method has not received sufficient attention from writers on this subject. Jacobson scarcely mentions it, and Bennett does not speak well of it. In the five years from 1889 to 1893, inclusive, there were undertaken at St. Bartholomew's Hospital 107 operations for varicocele; of these, 48 were performed subcutaneously, —i.e., 44.85 per cent.; and with the exception of 3 cases, in which slight suppuration occurred, there was no *contretemps* whatever, other than slight orchitis in 4 cases; eliminating the latter, these cases show a percentage of 93.75 of non-septic recoveries. Such a record compares very favorably with the results of the open methods, as will be seen in the statistical table which shows the number of operations performed during the five years from 1889 to 1893, inclusive:—

Year.	Cases.	Operation.		Suppuration.		Average age.	Reason.	
		Open.	Subcutaneous.	Open.	Subcutaneous.		Pain.	Services.
1889	19	11	8	7	0	22	13	6
1890	17	10	7	6	1	21	12	5
1891	11	8	3	4	1	20	7	4
1892	21	15	6	2	1	21	10	11
1893	39	15	24	3	0	23	20	14

All the varicoceles, with one exception, occurred on the left

side. In the statistics just given it will be seen that of the 107 cases 59 were done by the open operation. Of these 59 cases there were 22 cases of suppuration,—mostly slight, certainly. Among these suppurating cases were 5 of hæmorrhage due to slipping of the ligature and one case in which a large portion of the scrotum sloughed. This brings the percentage of healing by first intention down to 62.72, the percentage of suppurating cases being as high as 37.28. Silk should be used for subcutaneous operations, but great care should be taken in the preparation of these ligatures, which should be boiled for half an hour, and then kept in either perchloride solution 1 to 500 or in 1 to 20 carbolic lotion.

He also emphasizes the advisability of tying the lower knot first, as it prevents the accumulation of blood in the included portion of the veins, which necessarily occurs if the higher ligature be first tied.

The following advantages are claimed for the subcutaneous method: (1) the short time it takes; (2) the absence of all blood-extravasation, with its attendant evils; (3) the complete safety in careful and skilled hands; (4) the excellent results which are obtained.

[Although agreeing in the main to the conclusions arrived at in this excellent paper, I must take exception to Wallis's opinion, that after the subcutaneous operation "the patient shall keep in bed for at least seventeen days." Five days to a week may be considered a sufficient time for confinement in bed. After that interval a patient can go about with safety, provided his scrotal contents are properly supported.—E. F.]

G. Frank Lydston, of Chicago, ¹⁸⁶_{Nov., '94} in the radical cure of varicocele, advocates an incision from three-quarters of an inch to an inch and one-half in length directly over the external ring and in the direction of the cord. The cord and its envelopes are then exposed and the veins brought into view by the employment of a blunt hook. When thus exposed, silk or silk-worm-gut ligatures are placed about the vessels much as in the subcutaneous operation.

F. W. Murray, of New York, ⁹⁶_{July, '95} prefers the open operation for the cure of varicocele.

[As, however, Murray's experience with the subcutaneous method was limited to two cases, in one of which he naturally got a poor result from employing catgut,—a ligature which is always absorbed before obliteration of the veins has been effected,—his views may be changed should he pursue his investigations farther in this direction.—E. F.]

W. W. Bowes, of Atlanta, Ga., ²⁴⁵_{Apr., '95} and J. H. Lowry, of

Neola, Ia., ¹_{Sept., '94} both present new varicocele-needles for use in subcutaneous ligation.

Tunica Vaginalis.

E. Goldmann ⁷⁶¹_{R.13,H.2} reports a case of tuberculosis of the tunica vaginalis associated with hydrocele in an individual 23 years old. The sac was opened and tubercle bacilli found in a section from the wall of the serous membrane. The cavity was then packed with iodoform gauze and allowed to granulate. Some time afterward a hernia appeared on the side which had been attacked by tubercle. In this case Goldmann was unable to decide whether the tubercular process was primary in the tunica vaginalis or secondary to a tubercular peritonitis. The subsequent occurrence of the hernia, however, led the author to suspect that the involvement of the tunica vaginalis may have been a secondary process.

Roswell Park, of Buffalo, ²⁴⁵_{Sept., '95} reports an instance of calcification of the tunica vaginalis as a complication of an old hydrocele

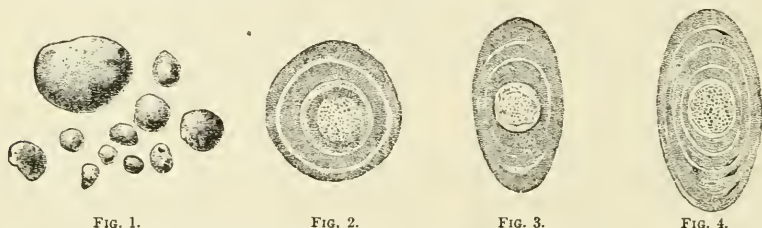


FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

FREE BODIES IN THE TUNICA VAGINALIS. (SULTAN.)

Virchow's Archiv.

in a patient 63 years old. The entire mass was removed, and on examination it was found to be ovoid in shape, four inches across, and consisting mostly of cholesterin crystals and fat.

G. Sultan, of Königsberg, ²⁰_{June 1, '95} reports a case in which numerous free bodies were found in the tunica vaginalis. Fig. 1 represents the natural size of these bodies, while Figs. 2, 3, and 4 represent the gross appearances of cross-sections. The writer considers that these masses originated from a fibrinous inflammation of the serous membrane.

S. Duplay, of Paris, ⁹⁹⁶_{Apr. 10, '95} reports a case of pachyvaginalitis, non-tubercular, non-syphilitic, caused by traumatism. He states that this affection is characterized by the production of false membranes, which become organized and by degrees transform the natural serous membrane into a coating like leather two to three centimetres thick. The testicle and epididymis are always involved in this inflammation. Hydrocele containing lemon-colored fluid is usually present, though at times the fluid may be blood-stained,

due to extravasation in connection with the newly-formed blood-vessels which exist in the thickened membrane.

Hydrocele.

Kops, of Antwerp, ⁴⁵⁴_{May, '95} advocates, after complete evacuation of the contents of an hydrocele, the injection of 2 grammes (30 minims) of a freshly-prepared solution of equal parts of carbolic acid and glycerin. Buschke, ¹⁰⁸_{Jan. 15, '95} inserts a large-sized trocar into the base, draws off the fluid, and washes the sac with a 5-per-cent. solution of carbolic acid. He then pushes the trocar on through the upper portion of the sac and passes through it a perforated drainage-tube. The trocar is then withdrawn, leaving the drainage-tube in its place. Cicatrization is complete in five days, and the drainage-tube can then be withdrawn. Nicaise, ³_{June 5, '95} after the usual antiseptic precautions, punctures the hydrocele with an ordinary trocar, allowing about one-third of the fluid to flow away, then injects 3 to 4 cubic centimetres ($\frac{3}{4}$ to 1 fluidrachm) of a 1-per-cent. watery solution of cocaine into the bulk of the serous effusion remaining in the sac, through the cannula of the trocar, with a syringe of the capacity of 4 cubic centimetres (1 fluidrachm). He then gently manipulates the scrotum, and after waiting four or five minutes draws off the remainder of the serous fluid and injects tincture of iodine, either pure or mixed with one-third of water, according to the age of the hydrocele and that of the patient. He then again gently manipulates the scrotum and allows the iodine to escape after four or five minutes. The author claims that this treatment is painless and effectual.

Pousson, of Bordeaux, ⁹⁹⁶_{Sept. 25, '95} washes out the sac with a 2- to 3-per-cent. solution of antipyrin, which, he asserts, causes sufficient anæsthesia to render the iodine injection painless and which also has the advantage over cocaine of not being toxic under any circumstances.

Anomalies.

Jordan ³⁴_{Sept. 10, '95} reports a case in which both testicles lay in the left scrotal partition. The two vasa deferentia were united in a common cord. A. Lane, of London, ²_{Dec. 1, '94} showed a boy, aged 15, from whom a small supernumerary testicle was removed from the right half of the scrotum. This organ had a separate tunica vaginalis and was normal in appearance, the vas running up in company with that of the normal testis on the same side. Both right and left testicles were absolutely normal, the right one being brought out through the incision and carefully examined at the time of the operation. Manipulation of the supernumerary testis,

which was as large as an ordinary marble, produced no testicular sensation.

H. Crutcher, of Chicago, ⁵⁹_{Mar. 16, '96} reports a case in which the left testicle was in the ischio-rectal space. An incision was made in the left scrotal pouch and the structure dissected away down to the misplaced organ, which was then drawn into its normal scrotal position and maintained there until union of the wound occurred.

Tumors.

Pilliet and Costes, of Paris, ⁹¹_{Aug. '96} have made an histological study of epitheliomata of the testicle. These growths are considered as originating in the mediastinum testis and are divided into the following varieties: teratomatous, Wolffian, and seminiferous. Tumors of the first variety are the most voluminous, those of the second are not so large and are apt to be cystic, while the third variety represents a compact growth which, on section, may show somewhat the appearance of a gumma.

Maylard, of Glasgow, ²¹³_{May, '95} reports a sarcoma apparently connected with the spermatic cord, within which hard masses were found, and which, from histological examination, proved to be true bone.

Morton, of Bristol, ²_{Nov. 3, '94} and Lowrie ²_{Jan. 5, '95} both report instances of sarcoma of the testicle in which there existed cavities filled with decolorized clot, thus imitating in many respects hæmatoma. Microscopical examinations in both instances showed the tumors to be sarcomatous.

SPERMATIC CORD.

W. J. and C. H. Mayo, of Rochester, Minn., ¹⁰⁵_{No. 105, '95} have sutured together the divided ends of the vas deferens and have obtained primary union.

[As the testicles in these cases have remained normal to the touch, these authors believe that they have obtained perfect results and that the seminal canals have continued pervious. Since the testicle, however, ordinarily feels normal after section of the vas deferens, actual proof of the perviousness of the canal of the vas deferens would be needed before these results are accepted as perfect.—E. F.]

John Van Der Poel, of New York, ⁵⁹_{June 15, '96} reviews the literature of strangulation of the testis and epididymis from torsion of the spermatic cord, and relates a case which is of special interest in that the torsion had occurred many times and was reducible by the patient himself. The father of this patient reported that at birth the right testicle had but partially descended.

Lexer, of Berlin, ²²⁶_{B.48,H.1} reports a case of torsion of the cord in which castration was performed.

W. Gifford Nash, of London, ²_{Jan.10,'95} reports that partial atrophy has occurred in the testicle of the boy in whose case he relieved an acute torsion of the cord by untwisting it after the testicle had remained strangulated for an hour and a quarter. (See ANNUAL for 1894.)

SEMINAL VESICLES, ETC.

Eugene Fuller, of New York, ¹_{Aug.31,'95} exhibited, at the meeting of the American Association of Genito-Urinary Surgeons, numerous photographs of dissections of the seminal vesicles and of the surrounding anatomy, which tended to clear up various anatomical points that had before remained in doubt. The exact relation which the prostate bore to the seminal vesicles was shown, and from this relationship inferences were drawn as to the mechanism of ejaculation. One photograph of the interior of a seminal vesicle, together with its ejaculatory duct, showed that the cavity of the ampulla of Henle was shut off from that of the vesicle by a valve-like opening, and that the former was very small in comparison with that of the vesicle. By these anatomical illustrations Fuller showed that the process of stripping the vesicles was possible, and that the material stripped out came from the vesicle, and not from the ampulla.

J. M. Thompson, of Boston ⁹⁹_{Nov.1,'94}; E. E. King, of Toronto ³⁹_{July,'95}; B. E. Vaughan, of New York, ⁴⁶²_{July,'95} and B. Foster, of St. Paul, ¹⁰⁵_{Aug.15,'95} have written articles on seminal vesiculitis, and all report good results from the adoption of Fuller's method of stripping the vesicles.

Jordan Lloyd, of Birmingham, ³²_{Oct.,'94} in an article on gonorrhœa and its complications, dwells on the frequency of the inflammation involving the seminal vesicles.

Reliquet and Guépin, of Paris, ⁷³_{June 22,'95} in a clinical and pathological study on the glands of the urethra, advance the theory that prostatic hypertrophy is frequently caused by a retention of the secretions of the prostate and seminal vesicles. This condition they call glandular prostatitis, and Reliquet recommends in treatment digital compression of the prostate in order to evacuate its contents, carefully avoiding any violence lest suppuration of the prostate and abscess result. Guépin ¹⁴_{Jan.23,'96} also holds that, wherever there is what he terms hypersecretion of the prostate and spasm of the urethra, there is also a retention of the secreting fluids in the prostate.

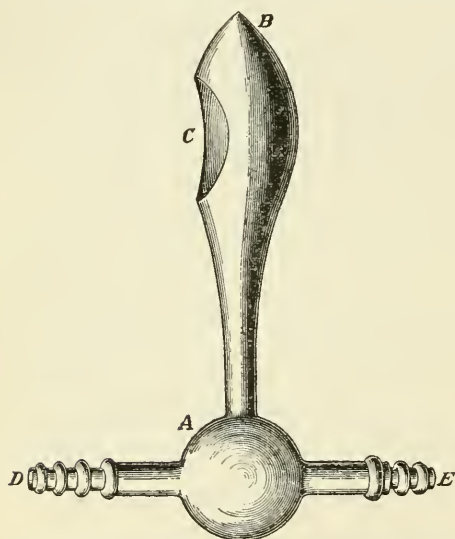
[The cases which these writers have studied represent, in all

probability, certain forms of seminal vesiculitis in which the walls of the sacs are distended and compressible. The treatment by digital compression of the prostate so called has proved beneficial only in so far as it has stripped from these sacs their inflamed contents.—E. F.]

Miscellaneous Disorders.

A. Wiener, of New York, ⁵⁹_{Apr. 15, '95} advocates for sexual neurasthenia the employment of a cooling apparatus similar to that of Arzberger's for the treatment of hæmorrhoids. Wiener's instrument consists of a simple metallic, cold-water coil constructed in the shape of the letter T.

The stem of the instrument (A) is narrower at the base than at the extremity, and is about one and one-half centimetres in thickness at its widest part, and one centimetre at the narrowest portion. It is bulbous at the extremity of the stem (B) and contains a slight concavity (C) just below the head of the instrument. Thus it easily adapts itself to the rectum, the concavity fitting itself very nicely to the prostatic portion of the urethra. At D and E rubber tubing is attached. One of these tubes is connected with a



COOLING APPARATUS FOR SEXUAL NEURASTHENIA.
(WIENER.)

Medical Record.

fountain-syringe containing cold water. The other tube carries off the drip. The author advocates the daily use of this instrument for from ten to fifteen minutes.

Cabot, of New York, ⁸¹⁴_{Nov. 1, '94} reports three cases of somnambulistic masturbation dependent, as he considers, on psychological derangement.

[Sometimes this condition may be dependent on seminal vesicular irritation.—E. F.]

E. C. Burnett, of St. Louis, ²⁴⁵_{Sept., '95} reports a peculiar case in which there seemed to exist more or less atrophy in connection with the prostate and seminal vesicles. The patient, when a young boy, had had a stone removed through the perineum,

and this the writer considers as the probable cause for the atrophic condition.

BLADDER.

Cystitis.

J. Englisch, of Vienna, ¹¹³_{B.36,H.8-13,'95} for purposes of treatment, divides vesical catarrh into three groups, as follows: (1) idiopathic, toxic, and gonorrhœal cystitis; (2) tubercular cystitis; (3) cystitis caused by general bacterial infection. The cystites of the last group are always secondary to some existing cause which favors germ proliferation, such as stone, tumor, enlarged prostate, renal lesion, etc.

For treatment of the first group during the acute stage internal remedies are advised, to the exclusion of local surgical measures except in case retention occurs. After the acute stage has subsided, however, antiseptic and astringent vesical washes are of value. For the second group treatment of the general diathesis is of the first importance. Occasionally vesical washes of astringents—such as acetate of lead, tannin, or permanganate of potash—are serviceable. Injections of iodoform should be avoided. For the third group attention should always be directed toward removing the primary cause before endeavoring to eliminate the catarrh by the use of local measures.

Freudenberg ⁸_{June 6,'95} has tried cantharidin in 56 cases of cystitis. The formula used was cantharidin, 0.0001 gramme ($\frac{1}{5000}$ grain); alcohol as solvent, 1 gramme (15 minims); distilled water, enough to make 100 grammes (3 $\frac{1}{4}$ fluidounces). A teaspoonful of this was given three or four times a day; larger doses did not succeed if this failed. Results: 1. In 5 cases no improvement; of these, only 1 was afterward cured by local treatment after trying other drugs; the other 4 resisted even operative treatment (cases of vesical tuberculosis, contracted fibrous bladder, etc.). 2. In 19 its action was slight or even doubtful, the strangury alone being improved or the urine clearing without the cure being complete. In one of these the cystitis was due to perforating silk sutures after laparotomy and the strangury was alone improved; in another the bladder had diverticula; some remained, however, in which the drug failed without apparent cause; for example, in one case of gonorrhœal cystitis afterward cured by sandal-wood-oil. 3. The remaining 32 cases were completely cured, often with surprising quickness. In 3 cases of gonorrhœal cystitis cantharidin succeeded where sandal-wood-oil failed. The following conclusions are drawn: 1. Cantharidin is approached only by sandal-wood-oil in its action in cystitis, and the latter is to be

preferred if urethritis is present. 2. Its advantages are its cheapness, tastelessness, and almost complete freedom from unpleasant symptoms,—at least, in the foregoing doses,—frequent erections being noticed only once (after use for ten days), formication once, and an eruption once. Disordered digestion or albuminuria never occurred.

Perivesical Inflammatory Disorders.

Eugene Fuller, of New York, ⁵⁹_{Apr. 13, '96} basing the pathology largely on the investigations of Noel Hallé (see ANNUAL of 1895), details the clinical symptoms due to chronic perivesical inflammation, and endeavors to show that there does exist a class of cases—rare, to be sure—representative of this condition, in which the clinical symptoms are most marked. It is only, however, when the pathological process completely, or in great measure, involves the entire extent of the surrounding perivesical connective tissue that clinical symptoms are present, these being due to the fact that the bladder is robbed of its expansive quality and forced to remain in a state of permanent contraction. The denser the perivesical inflammation, the more contracted the bladder and the more rigid its walls; so that in extreme instances the vesical capacity is almost *nil*. When but a fraction of the area of the bladder-walls is involved, the remainder undergoes a certain amount of compensatory hypertrophy of its muscular walls, thus enabling the bladder to exercise its expansive and contractive functions, and, consequently, no subjective symptoms result.

In the majority of cases presenting subjective symptoms the surgeon is liable to find a history of severe gonorrhœal cystitis, occurring perhaps years previously in a lymphatic or tubercular subject; or, less commonly, there may have been no gonorrhœal element in the cystitis, it having been tubercular, infective, or traumatic. In some cases there may be no inflammatory vesical history, as in those in which the pericystitis is caused by a neoplasm or—and this is very rare—in those in which the inflammatory focus is independent of the bladder, being connected with some near-by organ. The urine voided may be purulent and loaded with inflammatory elements such as one would expect to find associated with chronic cystitis, or it may be clear and free from such elements. This latter condition of the urine may be found in cases in which a previous cystitis has ended in resolution as far as the vesical mucous membrane and the submucous tissues are concerned, and in cases in which there has never been inflammation of the vesical mucous membrane.

Symptoms in connection with urination are constant and most

marked. In all cases there is an inability to hold the urine for more than a short period, the quantity voided at a given instance being small, thus corresponding with the capacity of the bladder. In cases where the lesions are severe the capacity of the bladder may be so small as to allow of no accumulation of urine, vesical incontinence resulting.

There is ordinarily little pain associated with such frequent urinary acts, and it is often entirely absent if no cystitis is present. There is no marked urgency preceding the act nor tenesmus after it.

Pain in the suprapubic region, in the lower part of the back, and in the perineal region may be complained of, and is generally described as dull in character and intensified by long standing or much physical exertion. In cases where cystitis co-exists the pains incident to that affection are also present.

If an attempt be made to pass a catheter the instrument, in case there is no organic stricture, will pass easily into the bladder, encountering but little spasmodic resistance in the membranous urethra and without causing the patient any special disagreeable sensations. A very small amount of urine—perhaps only a few drops—will flow from the catheter after it has entered the bladder. If then an attempt be made to inject the bladder through the catheter it will be found possible to do so, only to a very moderate degree. If forced attempts be made to inject fluid the result will be a prompt and strong return-flow, generally along the urethra outside the catheter, thus tending in a marked manner to force out the instrument. This return-flow is, however, associated with little or no sensations of vesical tenesmus. Typical cases cannot be cured, but those originating from a cystitis can in some instances be more or less benefited by prolonged and persistent treatment. A number of cases illustrating this condition are described by the author.

[There has been some tendency to confound cases of peri-vesical inflammation with the well-known condition of muscular vesical hyperplasia. The conditions, however, are entirely different. In the latter class of cases there always exists some obstruction to the outflow of urine, and if that obstruction be removed a cure of vesical hyperplasia will eventually result.—E. F.]

Vesical Tuberculosis.

L. Bolton Bangs, of New York, ⁹⁶_{Aug., '95} writes on the relative value of operative and hygienic measures in the treatment of tuberculosis and neoplasms of the bladder. For neoplasms, of

course, early and radical surgical measures are advocated. As regards vesical tuberculosis, however, the author, after a considerable experience with operative procedures undertaken in the hope of affording relief, is of the opinion that hygienic measures accomplish far more than surgical ones. Patients of this class require at least two years of good hygienic residence in a temperate climate; but, besides climate, they need occupation, for in his observation *ennui* seems to be almost as deteriorating as confinement to the house. Surgical traumatism, produced by overzealous efforts to relieve local symptoms, seems to result in more harm than good, and is apt to put the unhappy patient still farther below par and facilitate the development of other tubercular foci either in the same organ or in one more distant. It is not necessary to enter into the question of whether the infection is an "ascending" or a "descending" one. The phrase deceives us. The bacilli are in the individual's blood, and they only await a local congestion (following some form of irritation) in order to lodge themselves and proliferate.

After faithful and zealous efforts to relieve the local symptoms of these cases by surgical interference, he was forced to the conclusion that the less instrumentation resorted to, the better. In the genito-urinary tract, as in the tubercular process elsewhere, the best defense of the tissues against the inroads of the bacilli, and that which finally effects a cure, is to be attained only by enabling the body to surround the tubercular deposits with a layer of healthy connective tissue. This can be done in no other way than by improving the quality and resisting power of the individual.

F. Guyon, of Paris, ^{June 2, '95}¹⁴ believes in treating certain rebellious forms of cystitis, most of which are tubercular, by vesical curettage and perineal drainage. He considers the perineal operation in these cases preferable to the suprapubic, since it affords more certain relief, and, if fistula follow, perineal leakage does not present the difficulties and inconveniences that hypogastric leakage does. In curetting he uses the Volkmann spoon.

W. Watson Cheyne, of London, ^{June 22, '95}⁶ reports four cases of tuberculous disease of the bladder treated by suprapubic cystotomy and drainage for a considerable period. The result was most satisfactory in all the cases, and he believes that practically the sole curative agent in it is the rest given to the bladder by the suprapubic drainage. Scraping ulcers in the bladder is a very unsatisfactory performance, and one cannot hope to eradicate all the disease in this way. The bladder-wall is a lax structure, and one cannot scrape an ulcer in it, unless on the anterior wall, with

sufficient vigor to remove all the tuberculous material. Rubbing in iodoform is still more unsatisfactory. If iodoform has any anti-tuberculous action at all, it is not a sudden one, and a single application can have little or no effect. On the other hand, to place the part at rest is to act on the principles which are at the foundation of the treatment of tuberculous disease elsewhere, and this is at once done by the establishment of permanent drainage. It was because he held this view that he continued the drainage so long in his cases (from six weeks to six months), and did not leave it off till he thought that the disease had been arrested.

C. Mansell Moullin, of London, ⁶_{May 25, '95} reports a case of tuberculous ulceration of the bladder in which great relief from suffering, together with much general improvement, followed suprapubic cystotomy and cauterization. The writer is strongly in favor of this treatment for such cases as do not yield satisfactorily to local applications of iodoform emulsion and bichloride of mercury in solution.

Trendelenburg, of Bonn, ³_{Apr. 27, '95} reported at the Twenty-fourth German Surgical Congress a case in which he had at one sitting successfully removed a tuberculous bladder and one kidney from a young girl, the ureter, in connection with the remaining kidney, having been grafted into the bowel. In this case a small portion of the bladder about the urethral opening was included in the ureteral graft.

[In this class of cases the hygienic treatment, as a rule, affords the best results, and it is only when cases fail to yield to measures of this nature and in which tenesmus is severe that operative interference seems warrantable. As regards the choice of operation, Guyon's advocacy of the perineal route should have great weight. It would seem, however, that in a considerable number of instances the suprapubic operation has accomplished everything that could be desired. The location of the vesical lesions should, in all probability, determine the route to be taken in establishing drainage. In cases where the vesical neck is so extensively involved that a perineal drainage-tube cannot be tolerated, the suprapubic cut is called for.—E. F.]

F. S. Watson, of Boston, ⁹⁹_{Feb. 7, '96} considers that, generally speaking, surgical interference in these cases is not attended by brilliant results, although occasionally suprapubic cystotomy may be of great value in relieving vesical tenesmus. In referring to renal tuberculosis the writer quotes from Facklam and Vigueron (see ANNUAL, 1894, vol. iii, F-2 to 49) and apparently agrees with their conclusions.

M. F. Porter, of Fort Wayne, ⁹⁶_{Oct., '94} also believes that uro-genital

tuberculosis most frequently begins as a secondary process in the epididymis or the prostatic-vesical region, and that tubercular involvement of the urethra alone is exceedingly rare.

[Porter bases his opinion in regard to the rarity of tuberculosis of the urethra largely on the negative replies received to letters addressed to a number of general surgeons asking their opinions on this point. In my opinion, tubercular processes originating in the deep urethra are not infrequent.—E. F.]

A. Lane, of London, ²_{Nov. 17, '94} reports a case of tubercular disease involving the perineum, prostate, ischio-rectal fossa, and rectum, which he treated successfully by injecting into the tubercular cavities a mixture of sulphur and glycerin.

Englisch, of Vienna, ³_{Feb. 27, '96} calls attention to tubercular infiltration of the cellular tissue around the prostate and bladder, which he considers almost always secondary to tuberculosis of the urinary tract. A finger in the rectum will show that gland to be hard and enlarged, but not tender to pressure. In extreme instances the indurated area may break down in places, abscesses resulting, which usually discharge into the urethra or rectum. Sometimes the infiltrating process is focused about the seminal vesicles, and in two instances the author has seen primary perivesical infiltrations associated with grave disturbances in urination.

Vesical Calculus.

A. E. Roberts, ⁶_{Feb. 9, '95} in an article on the distribution of vesical calculus in India, endeavors to show, by elaborate tables and statistics, that natives of India living in sections where the chief article of diet is a vegetable or cereal deficient in common salt are particularly prone to calculus.

Gilbert Barling, of Birmingham, ⁶_{Mar. 9, '95} publishes further statistics on the mortality of the various operations for the removal of vesical calculus. The period covered is five years—from 1888 to 1892 inclusive—and the statistics are from the records of six metropolitan and seven provincial hospitals, the majority being medical schools. He does not include earlier periods than that selected, as the high operation was then on probation. Tables published with the article show that the proportion of deaths following the various operations furnish the following results:—

Litholapaxy: 300 cases, 24 deaths = 1 in 12.5 = a mortality of 8 per cent.

Suprapubic lithotomy: 169 cases, 26 deaths = 1 in 6.5 = a mortality of 15.4 per cent.

Lateral lithotomy: 96 cases, 5 deaths = 1 in 19.2 = a mortality of 5.2 per cent.

Median lithotomy: 48 cases, 6 deaths = 1 in 8 = a mortality of 12.5 per cent.

Adding these together, we get a total number of cases 613, deaths 61 = 1 in 10 = a mortality of 10 per cent. on the series. A few comments are necessary. Litholapaxy deals with the most favorable cases of stone—namely, those in which the calculus is of small or moderate size—and its best results are shown above the age of 20 and under 50.

The suprapubic mortality is considerable. This is not surprising in old people, who bear any cutting operation badly, and should, therefore, as far as possible, be reserved for crushing. But in children the death-rate is so considerable as to call for careful consideration. He contrasts the mortality of modern operations for stone with that which prevailed when only lateral lithotomy was practiced. Sir Henry Thompson²⁰⁸⁶ in an analysis of stone cases, all operated on by lateral lithotomy in various metropolitan and provincial hospitals between 1790 and 1840, states that the total number was 1827, the deaths were 229, the rate of mortality being, therefore, 12.5 per cent. With this may be contrasted the death-rate from the various operations from 1888 to 1892: Number of cases 613, deaths 61, mortality 10 per cent.,—a reduction of 2.5 per cent. as compared with the previous period. It is at first sight disappointing to find that the reduction in mortality is not greater, but the figures in detail show that in Thompson's tables the majority of the patients were considerably younger than those collected by Barling. Doubtless in those early days many elderly patients were advised to endure their suffering rather than face the risk of lateral lithotomy,—then the only resource,—and this must affect the comparative mortality. The author further confirms the opinion previously expressed in a former paper that lateral lithotomy and litholapaxy are safer operations in children than the suprapubic, and that if the last-mentioned is to be adopted as a routine procedure in the future it must be shown that it gives better results than it does now.

Rasumovsky²²⁶ publishes ten cases of suprapubic cystotomy for vesical calculi in children, varying in age from 18 months to 12 years, in which the vesical wound was tightly sutured and no catheter left tied in the urethra. In all these cases recovery took place without any complications. Darjushinski⁸⁵⁹ reports two such cases. Folinea⁵⁸⁹ reports seven cases in which he performed suprapubic cystotomy in children for stone. All his cases did well. He believes in complete suture of the bladder wound, provided that organ be healthy.

Tailhefer, of Toulouse,¹⁰⁸⁸ writes a careful review of the

literature of complete suture of the bladder after the removal of stone by suprapubic cystotomy.

[The results obtained by these authors go to disprove the conclusions of Barling, derived from English statistics, that the extraction of stone from children by the suprapubic route is fraught with much danger. In the English statistics the suprapubic vesical wound was apparently left open, and that, in all probability, is one of the chief causes for the increased mortality. It would seem, however, with the statistics of English surgeons in India before us, that litholapaxy should always be the operation of choice in these cases.—E. F.]

L. Bauer, of St. Louis, ³⁶⁴_{Apr. 27, '95} again calls attention to his method of rectal cystotomy, and urges its employment in many cases of stone as superior to other cutting operations.

Vesical Tumors.

Rehn, of Frankfort, ³_{Apr. 27, '95} in writing on the etiology of vesical tumors, calls attention to the fact that 86 per cent. of such growths occupy the bottom of the bladder, and especially that portion in the neighborhood of the ureteral opening. In other words, vesical growths start from that portion of the bladder most exposed to the action of irritants when such substances are excreted in the urine. In support of his theory he cites an instance where out of 45 workmen in an aniline-dye factory 3 developed tumors within the bladder and about the ureters, while a fourth developed hæmaturia. As regards the nature of the vesical tumors, 2 were fibromata and 1 carcinoma.

Nitze, of Berlin, ³_{Mar. 13, '95} states that he has operated for the removal of vesical tumors 66 times by the suprapubic route, with a mortality of $17\frac{1}{2}$ per cent. In 18 of these cases he tightly sutured the vesical opening and in 13 of them not a drop of urine leaked through the wound. For many benign tumors, however, the author prefers the intra-vesical method of removal, aided by the cystoscope and the instruments which he has invented for this purpose. The hæmorrhage which follows this method of operation is not ordinarily sufficient to cause trouble, but if, however, it is very severe, a suprapubic cut may be necessary to control it. Nitze performed this intra-vesical operation on 2 women and 8 men. One of the women died shortly afterward from pulmonary hæmorrhage, but the other 9 cases did well, and in only 2 of them was there much hæmorrhage. The tumors varied in size from that of a hazel-nut to that of an apple.

Terrier and Hartmann, of Paris, ³⁵_{Apr. 20, '95} present a study of myomata of the bladder, which are held to be very rare, only about

sixteen cases being on record. They are analogous in structure to uterine fibroids, and may project either inside or outside the bladder. When the growth projects outside the bladder it gives rise to few subjective symptoms, unless it be so large as to interfere with the function of neighboring organs. When, however, it projects inside the bladder it interferes with urination and may also cause hæmaturia.

Goldberg¹⁰²⁶_{v.5,p.467,'94} reports two resections of the bladder for cancer. In the first the growth involved the right ureter, and, after resecting the bladder, the cut end of the right ureter was grafted into the top of the bladder near the left one. The patient died. In the second case the posterior wall of the bladder was successfully resected. The author, in reviewing the literature, concludes that resection of the bladder for tumors offers no more danger than the older method of simple extirpation.

Clado, of Paris,³⁶⁰_{Oct., '94} in order to perform a vesical resection which includes also the peritoneum, as may be necessary in certain instances, first performs suprapubic cystotomy and seizes the pedicle, together with the surrounding vesical walls, thus causing a turning in, or invagination, of the outside peritoneal surfaces of the vesical wall. An abdominal section is then made and by a line of sutures the opposing vesical peritoneal surfaces are brought tightly and securely into apposition. The tumor and its pedicle are next removed by an incision which extends between the clamp and the peritoneal line of sutures.

L. Bolton Bangs, of New York,⁵⁹_{Apr. 27, '95} in a number of cases occurring in elderly men, has adopted the method of Chismore, of San Francisco, using cocaine for local anæsthesia and employing several short sittings for the crushing and washing out of fragments rather than one prolonged operation. He considers this method of value in suitable cases, but advocates care in the use of the cocaine. Two ounces (62 cubic centimetres) of a 2-per-cent. solution is as much of this drug as can apparently be used with safety.

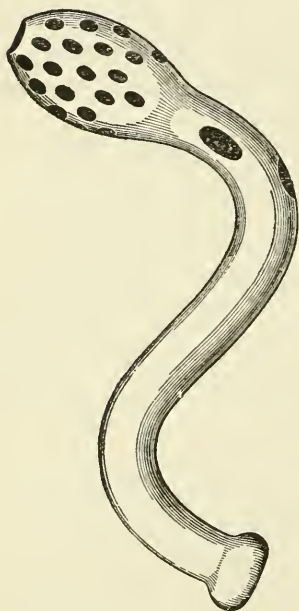
Guyon and Michon, of Paris,²⁶⁶_{May, '95} point out the valuable service rendered by a stationary catheter, and advocate for this purpose the soft instrument of Pezzer with a bulbous end, introduced along the urethra over a probe.

N. Senn, of Chicago,⁹_{Dec. 15, '94} presents a hard-rubber suprapubic drainage-tube, intended to be worn in cases which require permanent drainage in that region. The figure on next page illustrates the instrument, the intra-vesical end of which is bulbous in order that it may be self-retaining. When fully inserted, the bulbous end turns upward in the bladder while the other end bends down-

ward over the pubes. Rubber tubing can be fastened to the outside end to carry off the drip.

Anomalies of Bladder.

H. C. Masland, of Bethlehem, Pa.,⁹ Nov. 3, '94 reports a case of exstrophy which he was able to alleviate by operating according to the procedure advised by Wood, of London. Trendelenburg, of Bonn,³ Apr. 27, '95 reported at the Twenty-fourth German Surgical Congress two cases in which vesical folds so obstructed the urethral outlet that partial retention resulted. He performed suprapubic cystotomy and in both obliterated the folds, causing a disappearance of vesical symptoms.



DRAINAGE-TUBE. (SENN.)
Medical News.

W. S. Armstrong,²⁰⁷ Aug. '95 of Atlanta, Ga., reports the successful removal by suprapubic cystotomy of a stone weighing $13\frac{3}{4}$ ounces (425 grammes). The patient was 29 years of age and had had vesical symptoms from his infancy.

Among the more important general papers presented during the year the following may be mentioned: W. Karsström,¹³ May 16, '95 who reports six cases of tumor of the bladder with the results of treatment; C. Steinmetz,³³⁶ Apr. 20, '95 who gives statistics of primary vesical tumor in children and records a case of his own; S. Derjushinski,⁸⁵² B 4, H. 2, '94 who describes four cases of vesical tumor in the male; and F. Guyon,²⁶⁶ Apr., '95 who considers the differential diagnosis between certain forms of cystitis and vesical neoplasms.

Wounds of the Bladder during Operation.

B. Farquhar Curtis, of New York,⁹⁶ June, '95 has written a most complete article on wounds of the bladder in operations for hernia. After recording a case of his own, together with a number of others, hitherto unpublished, occurring in the practice of Weir, Bull, Stimson, Hartley, Gerster, and Hotchkiss, he studies the anatomy, etiology, diagnosis, and treatment of the class of hernia partially made up of bladder-wall. The complication is usually first recognized during a radical operation for hernia. If the bladder-wall is uninjured it should be reduced. If, however, it

has been accidentally incised the cut should be securely sutured with catgut or fine silk.

F. Treves, of London, ⁶June 8, '95 and C. Maunz, of Munich, ³⁴Aug. 6, '95 both report cases of hernia which contained a knuckle of vesical wall. Walther ¹⁴July 10, '95 also reports three cases.

Rupture of the Bladder.

W. J. Walsham, of London, ⁶⁷³July, '95 read an important paper on intra-peritoneal rupture of the bladder and reported a case of his own in which he successfully sutured the rent. The diagnosis was established by inflating the bladder with a few cubic inches of air forced in by two or three compressions of the rubber ball of an ether-freezing microtome. The abdomen at once became tympanitic and the liver-dullness effaced. The rent was closed by fourteen silk Lembert sutures, the pelvic cavity irrigated with perchloride of mercury and boric lotion, and the abdominal wound sewn up after the bladder had been proved competent by injection of milk. An interrupted recovery took place. The case appeared to be the first in which the inflation test had actually been put into practice, and the conclusions drawn from a single experience were: (1) that the amount of air to be introduced need only be very small,—not more than three or four cubic inches; (2) that only very moderate pressure is required for the inflation; (3) that the presence of quite a small amount of free gas in the abdominal cavity is sufficient to establish the diagnosis beyond a doubt, and (4) that the introduction of gas into the abdominal cavity, even in small quantity, is attended by a profound disturbance in the patient's general condition. The disturbance which followed in this case at once passed off on opening the abdomen and allowing the free air to escape. It was suggested, therefore, that the test in future should not be applied till the patient was on the operating-table, so that, should the collapse threaten life, the abdomen could be opened at once. In the after-treatment of the case it was contended that a catheter should not be left in the bladder,—first, because it was not necessary, and, secondly, because of the risk of cystitis and septic infection. Of the 28 cases recorded by various operators 11 recovered and 17 died. Of the 11 that recovered, in only 1 was peritonitis present at the time of operation, while, conversely, of the 17 that died, in 8, and probably in 9, peritonitis had already set in. The causes of death in the 8 cases in which there was no peritonitis at the time of operation were, in 5, shock or hæmorrhage or the two combined, and in 3 peritonitis, the peritonitis in 2 out of the 3 being due to leakage of the rent or giving way of a suture. In no fewer than 4 out of the 28 cases

was the bladder found, at the post-mortem examination, to leak. The importance of testing the competency of the bladder by injecting milk or other bland and easily-detectable fluid could not, therefore, be too strongly urged.

James Murphy²_{Nov. 3, '94} reports a case of very extensive intra-peritoneal vesical rupture which he successfully treated by tightly suturing the rent and tying in a catheter introduced through the urethra.

J. A. Reid²⁸⁵_{Dec. 20, '94} reports a peculiar case of what appeared to be a rupture of the mucous and muscular vesical layers, the peritoneal covering remaining intact. The result of the injury was that an extravasation sacculus formed outside the vesical cavity, the walls of which were made up, in great measure, of the peritoneal vesical covering. A year after the injury, by an incision through the abdominal muscular wall, the sacculus was laid open, drained, and obliterated. In performing the operation the author avoided opening the general peritoneal cavity.

Kofmann, of Odessa,²⁹⁷_{Nov. 43, '95} reports a case of intra-peritoneal rupture cured by operation, and Soulié, of Marseilles,¹⁴_{June 2, '95} a case of stab wound in the buttocks penetrating the bladder, in which suprapubic drainage was employed and recovery ensued.

PROSTATE.

Prostatic Hypertrophy.

Castration.—J. William White, of Philadelphia,⁹⁶_{July, '95} in a very extensive paper on the results of double castration in hypertrophy of the prostate, records everything of moment said or done up to date on this subject. He divides his paper into (1) a theoretical, (2) a clinical, and (3) an experimental portion. After discussing the various theories which have been advanced for the existence of senile hypertrophy, the author opens the second portion of his paper with the recital of the histories of three cases,—one operated on by himself, one by Beach, of Boston, and one by Gerster, of New York,—all of which were brilliantly successful and in all of which careful examinations of the prostatic conditions had been made both before the operation and afterward, when relief from symptoms resulted. The author chooses these three cases because they appear to him to bring up all the points which have thus far been in dispute as to the cases reported as “successful.” The critics of the operation have said (*a*) that they still regarded it as a physiological experiment; (*b*) that the reported cases lacked detail and did not prove that the same results would not be obtained by rest in bed, careful catheterization, regu-

lated diet, etc.; (*c*) that the subsidence of the symptoms and of the bulk of the gland, as reported, was too rapid to be due to atrophy, but must be owing to the disappearance of congestion and œdema; (*d*) that, at any rate, a true hyperplasia could not disappear in so short a time as has been reported; (*e*) that the estimates, both of the size of the hypertrophied gland and of its reduction in size, were inaccurately expressed; (*f*) that it was unreasonable to suppose that a long-standing cystitis would vanish even if the prostate did shrink; (*g*) that a vesical calculus in a post-prostatic pouch might be overlooked and only discovered later, and (*h*) that the cases had not been observed for a sufficient length of time to make the results reliable.

The author has collected and tabulated 111 cases, and remarks that the successful cases may be grouped, as to time of report, in three classes; 1. Those reported immediately after the operation—*i.e.*, within the first two or three weeks—and from which nothing further has been heard; these number 7, or 8.7 per cent. 2. Those in which from a month to three months elapsed before the patient passed from observation, and in which the prostatic changes and the improvement in symptoms were carefully noted; these number 16, or 20 per cent. 3. Those observed after three months, and in which the local changes seem to have reached their culmination and the health of the patient appeared to be permanently re-established; these were 57 in all,—a percentage of 71.3. It is obvious that enough cases have been followed for a sufficient length of time to warrant belief in the permanence of the cure when once effected. That there may be remote general effects from the operation not now known or appreciated is, of course, a possibility; but it seems unlikely that anything new will be observed in this respect, as castration is one of the oldest-known operations and has been investigated, both as to immediate and remote consequences, with great detail and thoroughness.

Out of these 111 cases there were 20 deaths,—a fatality of 18 per cent. White holds that this mortality is really much too high, since he considers that, for one reason or another, a number of the fatal cases could, with fairness, be excluded in reckoning the percentage of mortality. The average age of the 86 patients included in the table whose ages were given is $66\frac{1}{2}$ years; the average age of the 14 cases among those who died in which the age was given is between 69 and 70. Although the years of the patient must be an important factor in determining the result in this as in other operations, it is the real age, rather than that of the calendar, which will tell. The senility of the tissues and the degree and extent of arterio-sclerosis, especially as affecting the integrity of the kidneys,

are more important than the nominal age. This varies widely in just these cases, the relationship between general atheroma and prostatic enlargement being so close that so distinguished an observer as Guyon has based upon it a theory of causation. White is strongly of the opinion that when a sufficient number of detailed cases for broad generalization are recorded the mortality of this operation will show a very direct relation to a few factors, the most important being the presence or absence of renal infection and the history of long-continued catheter life, or of a number of attacks of complete retention, or of a large amount of residual urine. If these factors are conjoined, the case would be of the most unfavorable type, the suppurative disease of the kidneys following infection crippling to the point of uselessness organs already suffering from the effects of prolonged backward pressure. In the 47 cases in which the duration of the prostatic symptoms was stated definitely the average was $7\frac{1}{2}$ years. In the 6 fatal cases in which the duration was specifically given the average was only 4 years. In the 22 cases in which the period during which the catheter was used is stated definitely the average was 4 years. In the 5 instances in the table of deaths it was 3.4 years.

Differences in the size, density, and shape of the prostatic overgrowth will probably be found to be minor factors in determining mortality and more important ones in relation to the degree of improvement effected by the operation and to the rapidity with which it occurs. After careful study of the cases White does not think the data sufficient for positive conclusions on these points. Of the 111 cases only 19 were not definitely stated to have been improved at the expiration of varying periods. Of these 19, 9 were included in the table of deaths, leaving only 10 per cent. of apparent failures. But, as in many of the whole number no mention is made of the density of the overgrowth and no estimate of the size, it is impossible to say whether or not these failures were due to the fact that in these cases the enlargement was of the hard and fibrous variety, with an abundance of connective tissue and relatively little glandular structure. Prostates thought to show this kind of enlargement have been reported as shrinking with rapidity, but, of course, the observers may have been mistaken. It is encouraging to note, however, that the microscopical studies thus far made seem to indicate an atrophy of the stroma almost as rapid as that of the glandular element.

The remote results of the operation cannot yet be determined. The cases of death with precedent mental symptoms described as "mania," "acute mania," "childishness," etc., are only such as

every surgeon is familiar with in a certain proportion of cases of operation on aged persons whose mental equilibrium is easily disturbed, and can have no bearing on the question of later mental changes as a result of the castration. With greater accuracy the large majority of them could be classified as "uræmia" and some of the remainder as "traumatic delirium." It is worthy of note that no mental or physical changes whatever (except favorable ones) have been observed in a single one of all the successful cases, some of them now dating back for nearly a year and one-half. All the information we have on this subject—and it is far from scanty—leads to the belief that the removal of the testicles from persons who have reached full adult life, and *a fortiori* from aged persons, has no effect whatever on the mental functions or on the general physical characteristics.

White presents the following conclusions:—

1. The function of the testis, like that of the ovary, is two-fold,—the reproduction of the species and the development and preservation of the secondary sexual characteristics of the individual. The need for the exercise of the latter function ceases when full adult life is reached, but it is possible that the activity of the testis and ovary in this respect does not disappear coincidentally, and that hypertrophies in closely-allied organs like the prostate and uterus are the result of this misdirected energy. This hypothesis would increase the analogy between the fibromyomata of the uterus and the adenofibromata of the prostate, which, from a clinical standpoint, is already very striking, and is further strengthened by the almost identical results of castration in the two conditions.

2. The theoretical objections which have been urged against the operation of double castration have been fully negated by clinical experience, which shows that in a very large proportion of cases (thus far in approximately 87.2 per cent.) rapid atrophy of the prostatic enlargement follows the operation, and that disappearance or great lessening in degree of long-standing cystitis (52 per cent.), more or less return of vesical contractility (66 per cent.), amelioration of the most troublesome symptoms (83 per cent.), and a return to local conditions not very far removed from normal (46.4 per cent.) may be expected in a considerable number of cases.

3. The deaths have been 20 in 111 cases.—a percentage of 18. But of these there seem to be 13 that may fairly be excluded in an attempt to ascertain the legitimate mortality in patients operated upon under surgically-favorable conditions,—*i.e.*, before the actual onset of uræmia or, better, before the kidneys have become disor-

ganized by the two factors rarely absent in advanced cases: backward pressure and infection. This would leave a mortality of 7.1 per cent., which will probably be decreased as advancing knowledge permits of a better selection of cases. It is important to note that, even in the desperate cases which make up this series of deaths, 15 (75 per cent.) showed improvement of symptoms or shrinkage of the prostate before they died.

4. Comparison with other operative procedures seems to justify the statement that—apart from the sentimental objections of aged persons, on the one hand, and the real, entirely natural, and very strong repugnance to the operation felt by younger patients—castration offers a better prospect of permanent return to nearly normal conditions than does any other method of treatment. The relatively greater degree of improvement in successful cases should be considered, as well as the mortality, in comparing the operation with the various forms of prostatotomy and prostatectomy. So, too, should the absence of any risk of permanent fistulæ,—perineal or suprapubic,—the ease and quickness with which the operation can be performed, and the possibility of avoiding altogether the use of anæsthetics, which, in these cases, are in themselves dangerous.

5. The evidence as to unilateral castration is at present contradictory, but there can be no doubt that in some cases it is followed by unilateral atrophy of the prostate, and in two cases at least it has resulted in a very marked improvement of symptoms. It is worthy of further investigation.

6. His experiments on dogs have shown, in nearly every case in which the vas deferens was tied or divided on both sides, that, without much change in the testicles, there were beginning atrophy and considerable loss of weight of the prostate. These experiments need repetition and confirmation, as the absence of corresponding testicular change seems to make the results somewhat anomalous. It is possible that the inclusion or severance of small, but important, nerves may account for the effect on the prostate.

7. Ligation of the vascular constituents of the cord or of the whole cord produces atrophy of the prostate, but in his experiments only after first causing disorganization of the testis.

Among the other important contributions on the subject of castration undertaken for prostatic hypertrophy are the following: Kümmell ⁴⁷⁵ reports 8 cases, with 1 death. The operation in these cases was followed by considerable relief of symptoms, and where the urinary function was not restored catheterization was rendered much easier, owing to the shrinkage of the prostate. Ramm ³⁶⁹ reports his fifth case, which was successful, and Koren

also reports ³⁶⁹_{Jan., '95} a successful case. H. O. Walker, of Detroit, ⁷⁸⁶_{May, '95} reports 7 cases; J. R. Hayden, of New York, ⁵⁹_{May 18, '95} 1 case; M. Moullin, of London, ²_{May 4, '95} 2 cases, 1 fatal; J. T. Haynes, of Sandusky, O., ⁵⁹_{May 11, '95} 1 case; Lütken, ⁶⁹_{Jan. 31, '95} 1 case; F. S. Watson, of Boston, ⁹_{Apr. 18, '95} 3 cases, 1 of which was fatal; M. F. Gavin, of Boston, ⁹⁹_{May 2, '95} 1 case; F. C. Thayer, of Maine, ⁹⁹_{Aug. 22, '95} 1 case; B. M. Ricketts, of Cincinnati, ⁷⁶⁰_{Dec. 1, '94} 1 case; J. D. Thomas, of Pittsburgh, ¹⁹_{Dec. 19, '94} 1 case; A. H. Levings, of Milwaukee, ⁹_{Aug. 17, '95} 2 cases; Finney, of Baltimore, ⁹⁶_{Mar., '95} 2 cases; Stretton, of London, ²_{Mar. 29, '95} 1 case; A. G. Faulds, of Glasgow, ²_{May 4, '95} 6 cases, with 5 deaths; J. P. Bryson, of St. Louis, ¹_{Aug. 3, '95} 1 case, and J. Griffiths, of England, ²_{Mar. 16, '95} 1 case, which died on the eighteenth day.

[The great majority of the writers just quoted are favorable to the operation, some of them enthusiastically so. In some of the cases recovery of voluntary micturition associated with a marked diminution in size of the prostate is alleged to have occurred on the fourth or fifth day after the operation. In most instances, however, when voluntary urination returned, it did so gradually after some weeks and progressively improved for several months.—E. F.]

Kümmell considers that only cases that still retain some vesical tone derive benefit from the shrinking of the prostate which results from double castration. Bryson ¹_{Aug. 3, '95} states that the demonstrable results are a marked and satisfactory diminution in the size of the enlarged prostate, without change in frequency of urination day or night, without alteration of tidal, but with slight decrease of residual, urine. Pyuria, bacteriuria, and pyelonephritis remain practically the same. In a few words, the double orchidectomy causes an almost complete atrophy of the prostate gland without effecting any change in a chronically inflamed and degenerated bladder, and equally without curing or even benefiting a chronic pyelonephritis from extension.

Griffiths made a careful histological study of the prostate in his case, in which death occurred on the eighteenth day, and found the changes produced to be: (1) proliferation of the columnar cells lining the glandular tubules; (2) acute fatty degeneration of the cells thus accumulated in the lumen of the tubules, with their disintegration and ultimate disappearance; (3) contraction of the tubules after a conversion of their naturally tall and slender columnar cells into low cubical or almost flattened small cells, and (4) in the stroma proliferation of connective tissue and unstriped muscle-fibre cells. It appeared that in parts many of the newly-formed cells in the connective tissue had disappeared or been converted into fibrous stroma in which there were no muscle-fibres

or only traces of them. In those parts of the stroma where the changes had taken place quickly the newly-formed cells were swollen and filled with fine granules of fat. The inference, therefore, from this case is that these structural changes in the enlarged prostate eighteen days after bilateral castration are preliminary to the ultimate atrophy of the glandular tubules and to the conversion of the prostate into a small, firm, and fibrous mass containing only remnants of the tubules and but few traces of its muscular fibres.

Faulds's experience with this operation in six cases is very distressing. Five of them, as has already been stated, died. Four of them were affected mentally to a marked degree by the castration, developing childishness, aberration, and mania. In the one who survived no improvement in the vesical or prostatic conditions was noted thirty days after the operation.

At the May, 1895, meeting of the American Association of Genito-Urinary Surgeons, Cabot, of Boston, ⁹⁹_{Aug 22, '95} referred to a case where marked mental symptoms followed castration in an aged individual. Keyes, of New York, also related a fatal case where mental symptoms developed together with great vesical tenesmus after the operation.

[Still, I do not condemn the operation, as I do not know enough about it; but it seems to me that on many accounts it is best to withhold judgment a little while and go slowly, and certainly not to operate on a man who is in a condition at all of urgency, or emergency, or progressive vesical spasm, even if just commencing. He should be operated on in periods of quiescence or periods of decline, because the operation does not always produce this immediate relief which we are led to expect when we read the brilliant articles stating that relief commenced the third day after the operation.—E. L. K.]

Bangs, of New York, ⁹⁹_{Aug 22, '95} states that enough testimony has been advanced for him to believe that there are cases which will be benefited by the operation of castration; but to decide which are these cases is a question to be considered with great care. He was asked to see in consultation a man, 64 years of age, who had all the evidences of prostatic obstruction, apparently extensive. The patient was straining in a most agonizing manner to expel a few drachms of purulent urine every two hours. He had a cachectic look, with an overdistended bladder. Bangs was asked if this were a case for castration, the surgeon having made up his mind to do the operation on a fixed day. He said he did not consider it a case for castration, as the kidneys were suffering and there was evidently need for immediate intervention. Nevertheless, castration was done, and the man died in a week. Bangs did not

believe that the case should have been left to the dangerous delay of atrophy,—and atrophy only to be guessed at,—but that the man should have been treated immediately by drainage, and subsequently, if necessary or if it seemed wise and judicious, by some operation for his radical relief. Again, he was asked by a physician to see his father, who was suffering from retention of urine. A catheter would have relieved immediate symptoms, but Bangs was informed that an orchidectomist had expressed the opinion that the only way to relieve the patient was to remove his testicles. Bangs claims that those two cases alone compel him to take a conservative position and demand of the gentlemen who wish to do orchidectomy upon every occasion that they shall present good and sufficient reasons for the operation, because the man who is suffering will accept anything. He agrees with Cabot, that the operation is so seductive, and relief so enthusiastically promised, that the profession is liable to be placed in the same position as in the days of early and too frequent ovariectomies.

Post, of Boston, ⁹⁹_{Aug. 22, '95} in giving his experience, mentions two cases in which he had done the operation. In the first the patient could, at the time of report, pass a fair amount of urine, the greatest passed being something like 5 ounces (150 grammes). He did not empty his bladder, there being still residual urine and pus in the urine. He had to be catheterized once daily. His mental condition had changed wonderfully for the better. The operation in his case was certainly a success. It had not restored him to youth; it had not entirely restored his bladder; but it had restored him to a condition in which he is partially independent of the physician.

Allen, of Boston, ⁹⁹_{Aug. 22, '95} in calling attention to the fact that some of the cases reported as cured of prostatic hypertrophy as a result of castration may have been wrongly diagnosed, pointed out that Fuller, of New York, has exhibited some photographs of dissections which showed how the distended vesicles may simulate enlargement of the prostate. Allen has observed this condition not infrequently, and recalled one case in which a diagnosis of enlarged prostate had been made, both lobes being apparently greatly hypertrophied, forming conical tumors with a deep sulcus between them. When the vesicles had been emptied the prostate was found to be of normal size and form. Among the numerous factors to be borne in mind in the study of prostatic enlargement, distension of the vesicles deserves a place.

Belfield, of Chicago, at the meeting of the American Association of Genito-Urinary Surgeons, held in May, 1895, also alluded to the fact that seminal vesiculitis may at times be mistaken for

prostatic hypertrophy, and made mention of a case where such an error in diagnosis had been made. In this instance a cure of the vesical symptoms had resulted from a course of strippings of the seminal vesicles such as Fuller has advocated. The same author has also warned against castration ⁶¹_{Mar. 9, '95} for prostatic enlargement, as he considers that the operation, owing to its ease of performance, is being recklessly done in many cases wrongly diagnosed as prostatic senile hypertrophy.

Samuel Alexander, of New York, ¹_{May 11, '95} fears that the operation will be performed too often and without due deliberation, owing to the enthusiastic way in which those who have performed it have urged its merits. He is convinced that equally good results are to be obtained by dilatation of the prostatic urethra and perineal drainage, and in the majority of cases of advanced prostatic hypertrophy requiring operation he would prefer the more certain method of treatment by prostatectomy to this uncertain, though much easier, operation.

[To most articles criticising this operation White has replied in a spirited manner, but, as his ideas in this connection have been fully quoted, these replies, owing to the space already given to this discussion, cannot receive special mention.—E. F.]

Launois, of Paris, ²⁶⁶_{Oct. '94} has made many physiological experiments which go to confirm what has already been proved by White, Ramm, Griffiths, and others. Charles A. Morton, of London, ¹³¹_{June, '95} reviews the literature of the subject.

Unilateral Castration.—White, ²_{Mar. 2, '95} as the result of some experiments, is inclined to think that after unilateral castration atrophy of the corresponding half of the prostate occurs, and asks any one having experience in this particular to publish it. As a result of this appeal E. Hurry Fenwick, of London, ⁶_{Mar. 9, '95} publishes a number of cases of unilateral castration in which such corresponding atrophy of the prostate, as judged from the rectal feel, did not apparently take place. Fenwick, however, states that shrinkage does take place after double castration, and considers that the profession owes much to White in this connection.

J. Ewing Mears, of Philadelphia, ¹_{Feb. 16, '95} thinks well of ligation of the spermatic cords in order to cause atrophy of the prostate. Pavone ⁹²¹_{June 1, '95} has made experiments which tend to show that atrophy of the prostate follows bilateral excision of the vas deferens.

Manasse, of Vienna, ¹¹³_{B. 36, p. 1022, '95} advises treating obstruction to urination consequent on prostatic hypertrophy by plugging the rectum with a tampon, thus obliterating the post-prostatic vesical *cul-de-sac*.

A. T. Cabot, of Boston, ⁹⁶_{Aug. 15, '95} discusses the most approved non-

operative methods of treating hypertrophied prostate. Francis S. Watson, of Boston, ⁹⁹_{Aug. 15, '96} takes up the operative treatment of prostatic hypertrophy and reviews, in a fully illustrated article, the various operations which have been undertaken for its relief.

Prostatectomy.—John P. Bryson, of St. Louis, ²⁴⁵_{Aug., '95} read a paper on this subject at the meeting of the American Association of Genito-Urinary Surgeons in May, 1895. He has performed this operation by the suprapubic route twenty-seven times, beginning at a time when the operation was in its infancy and the technique far from complete. The rectal bag of Petersen was used in every case, and in only one instance was there any symptom of irritation to be attributed to it. The mortality for the entire series (27 cases) was a little more than 25 per cent.; but this by no means represents the true death-rate for prostatomyomectomy. From the mortality-list 3 cases should be excluded, 1 of which died from hæmorrhage from sarcomatous disease of the prostate and the other 2 of pyelonephritis. Eliminating these 3, we have 24 cases, with 4 deaths,—a mortality of 16.6 per cent. A radical cure was obtained in 13 of the cases, evidenced by the absence of residual urine, good rest at night, and a practical cure of the cystitis. Three cases developed tuberculous disease, 2 of which have succumbed to that malady and the third one being fairly well, with no residual urine. In 2 cases no benefit whatever appears to have resulted; these patients were aged, respectively, 72 and 78 years, were far advanced in senile degeneration, and were operated on mainly in the hope of relieving the most distressing symptoms of “prostatism,”—namely, frequent and painful urination and inability to rest, either day or night. In 9 cases the medio-perineal incision was combined with the suprapubic for the purpose of assisting in removing submucous and intra-mural masses or to secure proper drainage, or for both purposes. In the earlier operations an attempt was made to close the supravescical wound with sutures, later on to abridge the incision by the same means, with the hope of hastening the closure of the wound; these efforts were unsuccessful in every instance. In 8 of the cases ether anæsthesia was employed, in 18 chloroform, and in 1 the latter was combined with ether. In only 1 case was there any irritation of the kidneys which could be clearly attributed to the anæsthetic.

Eugene Fuller, of New York, ²⁴⁵_{June, '96} in reporting six successful cases of prostatectomy, states that the only true argument against the direct removal of the obstruction is its mortality. This, of course, is a strong argument, since the subjects are elderly and, owing to the nature of their disease, prone to renal insufficiency.

Everything else is in favor of it, for in all cases the operator should be able to thoroughly remove the obstruction. He should also be able to accomplish this without permanent injury to the vesical neck by lacerating or tearing away the mucous structures. When once such an obstruction is thoroughly removed the patient can be safely assured that he will never suffer from prostatic hypertrophy again. In almost all cases, also, the use of the catheter can be entirely dispensed with after convalescence from the operation is wholly established, the apparently atonied bladder gradually regaining its muscular force until finally it throws off a full, forcible stream. In many instances previous evidences of renal trouble, due to pyelitis caused by dilatation of the ureters and pelvis, gradually disappear as these muscular structures, as well as the bladder, regain their tone. As a result of all these changes and regenerations, the patient at the end of six months or a year after the operation is apt to report hale and hearty, declaring that he feels ten years younger and that his act of urination is all that he could desire. Fuller is aware that many surgeons will consider that the foregoing statement in favor of the radical removal of the obstruction is too rose-colored, and will point to the indifferent results obtained in many instances by early operators to sustain their opinions. He, however, holds that the argument that the results to be expected from it are indefinite and unsatisfactory is a false one, based on cases in which the removal of the hypertrophy at the time of the operation was incomplete. In many of the earlier unsatisfactory cases the object of the operator was simply to chisel out, as it were, a canal through the obstruction at the vesical base connecting the post-prostatic vesical *cul-de-sac* with the membranous urethra, no attempt being made to remove lateral obstructions or the rigid hypertrophies surrounding the prostatic urethra. If, however, all the hypertrophies, median, lateral, and round about the prostatic urethra, are removed, as they should be and as they can be by adopting the method advocated by Fuller, he claims that the results, as far as the bladder is concerned, are, barring mortality, satisfactory.

In the earlier operations of this nature not only was the prostatic obstruction in many instances imperfectly removed, thereby giving imperfect and unsatisfactory results, but the death-rate also was large. The chief causes of death were: hæmorrhage,—generally primary, sometimes secondary; shock,—often intensified by the removal of vesical tampons (always a difficult matter) which had been tightly packed into the bladder to stop hæmorrhage; sepsis, which was favored and intensified by extensive damage to the vesical walls in the prostatic region and by the open and

exposed state of the suprapubic wound; defective drainage, and renal insufficiency.

To avoid as far as possible these mishaps Fuller has adopted the following procedure: The patient is placed flat on his back, neither the Trendelenburg position nor the Petersen bag being commonly found necessary. The bladder is carefully washed out and then left moderately distended to the extent of from eight to twelve ounces. The next step is to open the bladder suprapubically, the general directions laid down by Keyes being followed. The forefinger of the left hand is then introduced into the bladder, the location and extent of the prostatic obstruction determined, and the vesical opening of the urethra located. A pair of rough, serrated edged scissors with a long handle are held in the right hand, slipped along the left forefinger to the urethral opening, and made to cut through the bladder-wall in that region from the lower margin of the internal vesical opening of the urethra backward for an inch to an inch and a half. The blades of the scissors, being rough and serrated, make an incision which bleeds but little. Then one of the forefingers, whichever the operator may find the more convenient, is slipped through the vesical hole made by the serrated scissors, while at the same time the fist of the other hand makes firm counter-pressure against the perineum. By means of this counter-pressure the prostatic growth is brought well into the reach of the forefinger of the other hand, which is employed all this time in enucleating the prostatic obstruction *en masse* or piece by piece, as the case may be. The enucleation can be easily and speedily accomplished in this manner, and should be continued until all the lateral and median hypertrophies, as well as all hypertrophies along the line of the prostatic urethra, have been removed. The vesical walls at the base, as elsewhere, are very elastic and dilatable; so that the little cut made through the bottom of the bladder will be found large enough to admit of the passage through it of the enucleated prostate.

A perineal section is then made, and a large-sized (No. 26 American) soft-rubber tube is passed through the perineal cut and the cut through which the prostate was enucleated into the bladder. After this hot water irrigation is employed for some minutes to wash out blood-clot and to stop oozing, when the suprapubic wound is closed by a deep layer of catgut sutures, which include the bladder-wall, and by a more superficial layer of silk-worm-gut (Florentine) sutures. About in the middle of the cut the catgut stitch is omitted and a deep Florentine gut suture is taken, including the vesical walls and the whole extent of the lateral abdominal walls. This suture is not tied at the time of

operation, thus allowing a rubber suprapubic drainage-tube to temporarily remain in position. At the end of four or five days, however, this suprapubic drain may in most instances be removed and the ligature tied, thus entirely closing the suprapubic cut.

It is best not to remove these Florentine sutures till after the patient is up and about, as without their firm support there is oftentimes a tendency for the soft scar-tissue of the wound to give way, thus allowing quite a considerable spreading of the abdominal structures.

Fuller's method of enucleating the prostate through a small hole made in the base of the bladder is accomplished by a technique almost the opposite of that advocated by Nicoll, of Glasgow (ANNUAL, 1895, vol. iii, E-49), ⁶Apr. 14, '94 and by Alexander, of New York, ²⁰⁸⁷May, '94 independently of Nicoll.

George Woolsey, of New York, ²⁴⁵July, '95 in a very instructive article on prostatectomy, makes a careful review of the literature to determine (1) the nature of the obstruction in prostatics and (2) the choice of operation for its relief. His conclusions are that intra-vesical prostatic growth is not always, though perhaps most often, the cause of obstruction requiring operative relief. The median portion plays a most important part by forming a valve in the majority of cases. The lateral lobes are often important factors, both intra- and extra-vesically, but especially the latter.

By means of von Dittel's lateral prostatectomy, which Woolsey views with favor, diminution in the size of the lateral lobes removes both the intra-vesical projection and the lateral compression caused by them. If a median outgrowth is present, this effect on the lateral lobes and the resulting cicatricial contraction and subsequent atrophy of the gland will prevent the median portion from acting like a valve by enlarging and lowering the vesical outlet. The median portion may even atrophy and disappear, and thus a "low-level route" eventually, if not immediately, be obtained. Drainage, not equal to perineal, but at least as good as suprapubic, is obtained through the urethra. While thus fulfilling the requirements of the case, it has the following advantages: There is no raw surface left, the mucous membrane being uninjured; it is safe, simple, and effective; it is done under inspection and not blindly, and there is less danger from hæmorrhage. Woolsey states that the best results are obtained by the suprapubic method combined with perineal drainage; but the objection to this procedure, however, is its mortality.

J. A. Sutcliffe, of Indianapolis, ⁵⁶June, Aug., '95 reports three successful cases of perineal prostatectomy, one complicated by an encysted calculus, which later on necessitated a suprapubic operation.

Abscess.

Casper, of Berlin, ⁴_{May 27, June 3, '96} states that if retention of urine has taken place, perineal vesical drainage is often necessary. When it has not occurred, however, as is frequent, especially in the earlier stages of suppuration, one of the following operative procedures is advocated, provided antiphlogistic treatment shows evidences of failure: (1) incision through the rectum; (2) through the perineum; (3) a prerectal dissection, exposing the prostate and allowing it to be laid open. The author has opened the abscess through the rectum eighteen times and through the perineum three times. There are objections to any of the methods, and the one most suitable to the individual case should be employed, opening the abscess, if possible, near where it has a tendency to point.

Routier, of Paris, ³_{Dec. 5, '94} favors the rectal incision, which has given him good and speedy results. A speculum is introduced and the incision made, and after washing out the cavity it is packed with iodoform gauze. The cases he has operated on in this manner all left hospital cured in from eight to ten days.

URETERS.**Fistula of the Ureters.**

Büdinger, of Vienna, ²²⁶_{B. 48, H. 3} asserts that most cases of ureteral fistula are due to surgical interference, and that in such cases several courses are open to the operator: 1. Immediate primary nephrectomy through a new incision or a transperitoneal one. This course is to be rejected in all cases. 2. The formation of a provisional fistula of the ureter opening in the abdominal wall, with the view of performing a secondary nephrectomy, if necessary, or closing the fistula. 3. Ligature of the ureter. This operation has the same disadvantages as primary nephrectomy,—namely, that one has to trust blindly to the functional integrity of the other kidney. 4. Suture of the ureter. Accurate suture would in many cases be the ideal method of treatment. Its dangers are, however, great, and consist, first, in the formation of a stricture; secondly, in the deficient firmness of the sutures; thirdly, in the projection of a suture into the urinary tract. 5. The immediate implantation of the ureter into a neighboring organ,—bladder, intestine, etc. The author prefers the latter method wherever practicable, and gives an account of his experiments on animals in this direction.

Calculus of the Ureter.

Albarran, of Paris, ²⁶⁶_{Mar., '96} reports an interesting case in which a stone had lodged in the lumbo-iliac portion of the ureter, causing

rupture of the ureter, abscess, and fistulæ. The author was able to extract the calculus, dilate and catheterize the ureter, and thereby cure the patient without sacrificing the kidney. He points out that calculi are apt to lodge in the ureter chiefly (1) at the pelvic outlet, (2) just behind the vesical outlet, and (3) at that portion of the canal where it passes over the brim of the pelvis,—i.e., the lumbo-iliac portion.

John B. Roberts, of Philadelphia, ⁹⁶_{Sept., '95} removed a calculus from the ureter by a peritoneal incision, having first tried a lumbar incision without success. Charles K. Briddon, of New York, ⁹⁶_{Jan., '95} removed a calculus lodged in the ureter by an extra-peritoneal incision extending along the outer border of the rectus muscle. This operation was secondary to a nephrectomy. R. Morison, of Newcastle-on-Tyne, ⁶_{Nov. 10, '94} reports two cases of the removal of stone from the ureter, one fatal.

Max Nitze, of Berlin, ⁴_{Apr. 22, 29, '95} states that it is fairly easy to catheterize the female ureters, as Kelly and Pawlik have proved, but

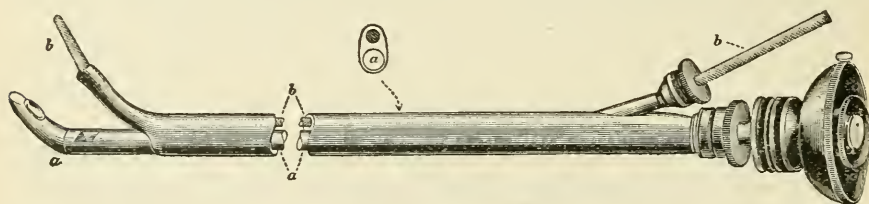


FIG. 1.—CATHETER. (NITZE.)
Berliner klinische Wochenschrift.

procedures similar to theirs, however, fail when employed in the male ureter. In order to make catheterization of the male ureter practicable the author has invented the instrument shown in the annexed cut (Fig. 1). It consists of an ordinary cystoscope with a tube attached through which the renal catheter can be slipped. To introduce the instrument along the urethra the end of the cystoscope (*a*) is drawn up to the end of tube (*b*). When, however, the instrument is once in the bladder, the end of the cystoscope is slipped back away from the end of the tube so as to illuminate the bladder. The catheter is then slipped along its tube and the end of the tube is turned against the ureteral opening. All that now remains to finish the procedure is to gently push the end of the catheter along the ureter, care being taken, however, to so turn the end of the tube that its direction corresponds to that of the ureteral opening, in order that the catheter may not enter the canal at an angle. Nitze considers that many of the previous failures have been due to the fact that attempts were made to enter

the ureter with catheters placed at an angle to the course of the ureter.

Fig. 2 shows the instrument in the interior of the bladder and so turned that the catheter is passing along the ureter.

L. Casper, of Berlin,⁶⁹ No. 7, '95 also presents a cystoscope with a

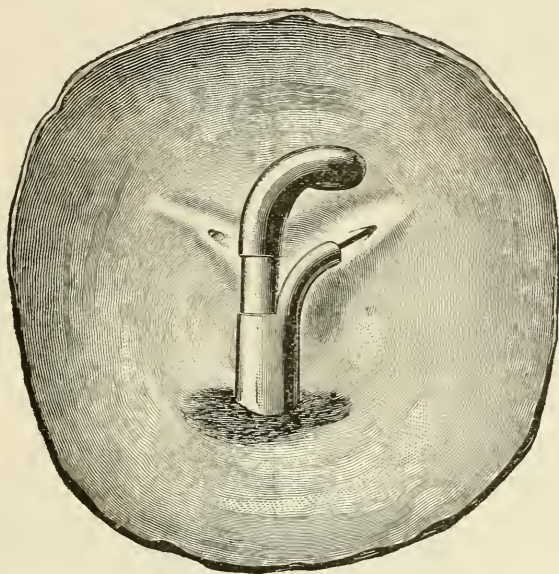
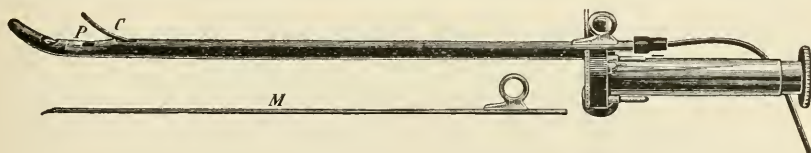


FIG. 2.—THE INSTRUMENT IN THE INTERIOR OF THE BLADDER. (NITZE.)

Berliner klinische Wochenschrift.

tube attachment through which a ureteral catheter can be made to pass. In Casper's instrument the light (*P*) is not placed at the end of the cystoscope. *C* marks the internal terminus of the canal, which is so deviated that the catheter passing out of it is made to take the bend as seen in the figure, which corresponds to



CYSTOSCOPE. (CASPER.)

Deutsche med. Wochenschrift.

the direction of the mouth of the ureter. *M* is the mandrin inserted in the catheter-tube while the instrument is being inserted along the urethra.

[This instrument has the appearance of being useful and uncomplicated.—E. F.]

Miscellaneous.

Absorption.—Pousson and Sigales, ⁹⁹⁶_{June 25, '95} as the result of experiments with solutions of lithium injected into the bladder, followed later by spectral analysis of the blood and saliva, conclude that the healthy vesical epithelium is impervious, but that absorption can take place when the subject having a full bladder experiences the desire to urinate, since the urine then comes in contact with the prostatic urethra. Absorption also takes place in conditions in which the vesical epithelium is abnormal.

Therapeutics.—E. Hurry Fenwick, of London, ¹⁰⁷⁷_{Jan. 23, '95} states that some obstinate inflammatory affections of the urinary organs may be materially benefited by incision and by exciting suppuration of a benign type in the cellular tissue of their immediate neighborhood and by draining off the products of the inflammation through the vessels of this layer. He has been accustomed to use the term "aseptic counter-irritation" for this method of dealing with chronic visceral inflammation, and thinks it is a more accurate and more energetic method of applying the seton or blister.

In substantiation of this theory a case is cited in which he obtained an unexpected and excellent result from making an incision into the space of Retzius in a patient suffering from vesical inflammation due to bilharzia. Before operating the case was supposed to be one of extra-peritoneal vesical rupture, owing to a brawny hardening in the suprapubic region, but after making an incision into the space of Retzius the mistake was discovered and the vesical wall was not incised.

In conditions of frequent micturition due to vesical hyperæsthesia Janet, of Paris, ²⁶⁶_{Feb., '95} has obtained good results from progressively distending the bladder with solutions of boric acid and directing the patient to retain the injected fluid as long as possible.

Anæsthetics.—Pousson, of Bordeaux, ²¹²_{Sept. 25, '95} claims that by the local use of antipyrin an anæsthesia of the bladder can be attained which is as complete as that which follows the use of cocaine and is at the same time free from danger. The author commonly employs a 2-per-cent. solution, but this strength can be safely increased to 4 per cent. The quantity injected varies from 30 to 100 grammes (1 to 3½ fluidounces) or more. In about ten minutes after the solution has been injected anæsthesia is obtained. Brik and Vigneron, of Marseilles, have also had success with this method. Bransford Lewis, of St. Louis, ¹¹⁴⁴_{July, '95} has successfully used Schleich's infiltration method in genito-urinary surgery. (See section on "Anæsthetics.")

Instruments.

De Martigny, of Paris, ²⁶⁶Mar., '95 presents a simple and practical contrivance for sterilizing soft urethral instruments by subjecting them to the action of sulphurous acid. The acid is put up under pressure sufficient to cause liquefaction in numerous little glass ampullæ. Each ampulla, containing enough acid for a single sterilization of a dozen or more instruments, consists of a glass bulb with a fine, tapering point, hollow almost to the end, where its perviousness has been obliterated and the cavity sealed by the application of heat sufficient to melt the glass. A long glass cylinder contains the catheters. This cylinder has a tight-fitting cap through which two rubber tubes pass. To use the apparatus the hermetically-sealed tip of the ampulla containing the gas is broken off, and to this broken end one of the rubber tubes is

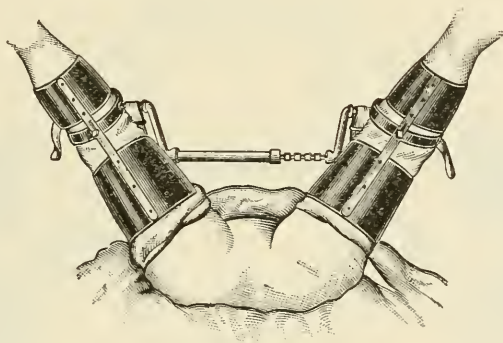


FIG. 1.—SURGICAL CRUTCH. (BROWN.)

Exposure of the perineum and position of the legs with the author's surgical crutch applied.

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quickly fitted. The free end of the other rubber tube is passed out through a window. The gas quickly circulates through the cylinder, sterilizing the instruments. When the sterilization is complete the perforated cap is removed from the glass cylinder and a tight cover put in its place. The catheters are then ready for use as occasion may demand.

S. Groszlik ⁶Mar. 23, '95 declares, as a result of experiments made by himself, that moist heat is the only agent which can render catheters thoroughly sterile, and also describes an apparatus which he has devised for that purpose.

F. Tilden Brown, of New York, ⁹⁶May, '95 presents the accompanying apparatus designed to remedy the defects of the Clover crutch. In enumerating the faults of the Clover crutch the author states that it seriously invades the operative territory. In urethrotomy it is

near enough to the penis to encroach upon some part of the arc which the handle of a sound or grooved staff must traverse to enter or leave the urethra. It invariably causes the operator to use undue force and a false lateral position to crowd the handle of the instrument under the bar. In operations upon the rectum, perineum, or vagina this straight bar, hung with sterilized cloths, shuts off light from the field of operation and fills the space convenient for instruments. The single neck-strap is faulty in that it exerts a considerable pressure upon the vessels and nerves of the neck, the deleterious effects of which are clearly marked in the congested state of the head and the unsatisfactory respiration

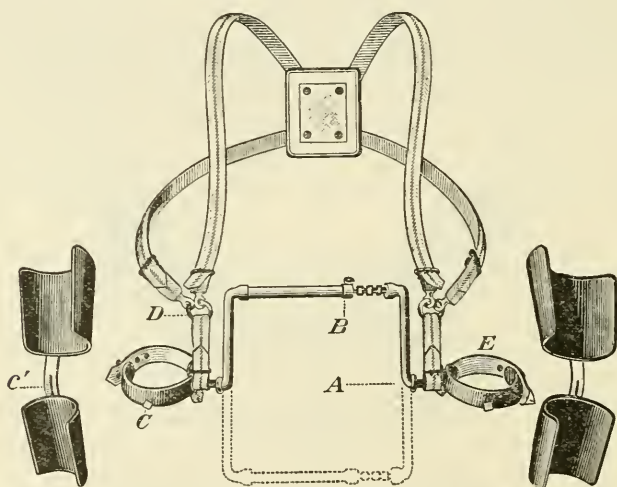


FIG. 2.—SURGICAL CRUTCH. (BROWN.)

Component parts of the author's crutch: *A*, point at which the arms of the extension-bar swivel in the leg-crutch; *B*, spring pressed upon to close the extension-bar; *C*, key on the leg-crutch which engages in the slot *C'* in the leg-rests and locks them together; *D*, the point where the two parts of the apparatus are joined by ring- and snap- catches when the crutch is on and the thighs are flexed; *E*, canvas strap which buttons over when the leg lies in the crutch. Dotted outlines show the position of the extension-bar if turned downward. As only canvas straps and nicked metal enter into the make-up of the apparatus, it can be washed and sterilized.

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during anæsthesia. These phenomena are particularly noticeable when the patient is flabby, plethoric, or alcoholic,—that is, it intensifies the dangers incidental to the anæsthetic state commonly noticed in such cases. (See Figs. 1 and 2.)

SURGERY OF THE KIDNEYS.

Pyonephrosis.

F. Tilden Brown, of New York, ²⁴⁵_{Apr., '95} reports three cases in which nephrectomy was performed for renal lesions caused by the colon bacillus. The first two cases occurred in the practice of McCosh and the third in that of McBurney. The ultimate results

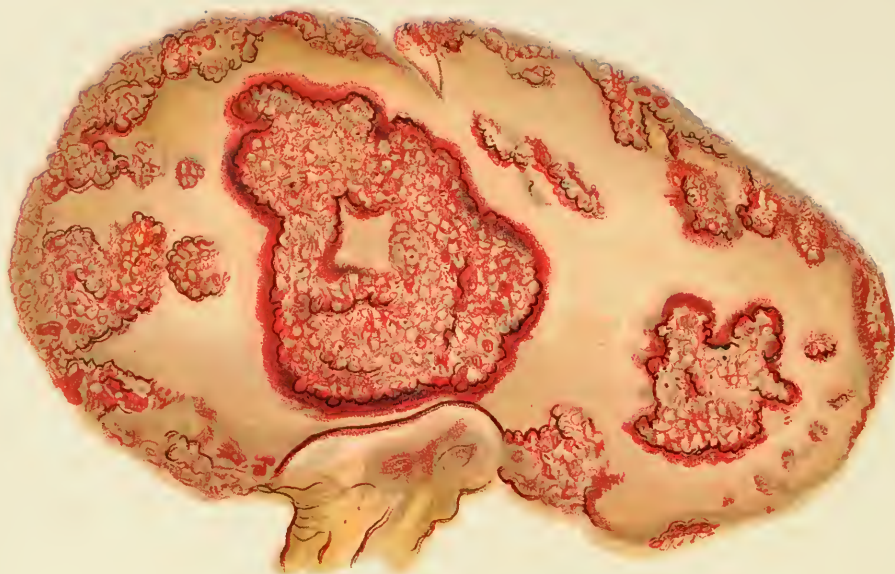


Fig. 1. Septic Kidney of Undermined Age.



Fig. 2. Early Stage Septic Kidney.

Septic and Tuberculous Kidneys (Brown)

were uniformly successful. The lesions caused by the colon bacillus were mostly peripheral, as shown in the plate, Figs. 1 and 2 giving the appearances in two of the cases. The author also presents a kidney showing the early stage of cortical tuberculosis, and calls attention to the similarity in gross appearances presented by this and the preceding condition, an histological examination being necessary to differentiate between the two.

R. F. Weir, of New York, ⁵⁹_{V.46, No. 11} successfully removed a surgical kidney from a man of 25 years, whose chief symptoms were fever, purulent urine, and localized renal tenderness. Weir cut down upon the organ and punctured it, expecting a show of pus, but none appeared. He then incised the kidney, when numerous miliary abscesses enabled him to make a diagnosis, and he removed the organ.

S. B. Woodward, of Worcester, ⁹⁶_{May, '95} reports four cases of nephrectomy for pyonephrosis, with one death. In three of his cases the nephrectomy was secondary to a nephrotomy.

Hydronephrosis.

Cramer, of Cologne, ³³⁶_{Nov. 24, '94} regards simple hydronephrosis as due, in many instances, to an inherited tendency, often associated with more or less malposition or mobility of the kidney. Normally the opening of the ureter is in the most dependent portion of the pelvis; but where the organ is misplaced or movable such is not the case, and hydronephrosis results. The treatment suggested is to restore the outlet of the ureter to the most dependent portion of the pelvis by means of grafting. The author reports two cases in which this form of treatment was resorted to, but is not, as yet, able to prove that they will be wholly successful.

A. Lane, of London, ⁶_{Oct. 20, '94} on opening an enormous cyst formed by an hydronephrosed kidney in a boy, was fearful of a fatal result if he removed the whole sac. On careful examination, however, he found that the major portion of the cyst-wall was made up of distended ureter and renal pelvis. Consequently he removed only that portion which was made up of kidney-tissue. The result was successful and at no time after the operation did any urine discharge itself through the wound.

Renal Calculus.

J. Ransohoff, of Cincinnati, ⁶¹_{July 6, '95} after reporting seven cases in which he incised the kidney for stone and after reviewing the literature, draws the following conclusions: 1. An absolute diagnosis of stone cannot be made. 2. Nephrolithotomies may be divided into those of necessity and those of choice. In anuria

and profuse hæmaturia delay is fatal. 3. Pyuria and microscopical hæmaturia, as indications of beginning destructive changes, are positive indications for operative exploration. 4. The oblique incision is to be preferred for the ease with which it permits the exploration of the entire kidney. 5. Acupuncture is not to be relied upon. 6. Incisions should be made along the convex border and only when the circulation is controlled by digital compression. 7. Incisions into the pelvis for exploration and for removing a stone are to be avoided. 8. Primary nephrectomy for stone should be reserved for extreme cases. 9. Primary union by suture, where feasible, makes nephrolithotomy an ideal operation. 10. Tight packing of the kidney wound and perirenal space endangers the nerve-supply of the colon. 11. Nephrorrhaphy should form the closing act of every operation which has seriously disturbed the relations of the kidney.

Greiffenhagen²²⁶_{B. 48, II. 4} also writes on this subject and draws somewhat similar conclusions. Tuffier, of Paris,³⁵_{Aug. 17, '95} writes on nephrolithotomy for small calculi, and agrees with Morris as to the importance, if necessary, of drawing the kidney out on the flank for critical examination.

McBurney, of New York,⁹⁶_{Aug., '95} reports a case in which almost total suppression of the urine occurred after a nephrolithotomy, although there had been little loss of blood at the time of operation. A quart (litre) of a solution of common salt was injected into a vein in the arm. The apparent result was a free diuresis. Within the next twenty-four hours 36 ounces (1100 cubic centimetres) of urine were passed, and on the following day 70 ounces (2200 cubic centimetres).

Grailly, of Lyons,²¹¹_{Sept. 15, '95} and Donnadien,²⁶⁶_{Sept., '95} both present theses on the surgical treatment of calculous anuria.

Neuralgia.

Senator, of Berlin,⁴_{No. 13, '95} in an article on neuralgia of the kidney, refers to a class of cases in which there exists no apparent lesion to account for the pain, the persistence of which generally leads to operation. In such instances either nephrectomy for exploratory purposes or simply a stripping of the capsule is apt to effect a cure. Duke⁶_{Aug. 17, '95} records a case of this kind in which an exploratory nephrectomy undertaken in a negative search for stone was followed by a cure.

Movable Kidney.

P. Delvoie⁸⁶⁸_{v. 4, No. 2} considers in an exhaustive manner the pathology and treatment of movable kidney. Albarran, of Paris,⁵⁵_{Sept. 14, 21, '95}

states that, out of 374 operative cases, but 7 deaths occurred within four months of the operation. In 4 instances only could death be attributed to the operation, and in 3 of these the complications were of an infectious nature, and consequently should have been avoided. As regards relief of symptoms, the results were successful in 78 cases out of 100 in which intra-parenchymatous sutures were employed. Nervous symptoms were, however, less often relieved than painful ones, 14 out of 100 being partially relieved, while 36 out of 100 received no benefit in this particular. With respect to pain, nephrorrhaphy was successful in 88 cases out of 100.

George M. Edebohls, of New York, ²⁷_{Feb., '95} has, since February 8, 1890, performed nephrorrhaphy on 50 patients, all women. In 9 of these both kidneys were anchored, making 59 nephrorrhaphies in all. One of the patients died. Of the remaining 58 only 2 have, to the writer's knowledge, relapsed. W. Bruce Clark, of London, ²_{Mar. 16, '95} reports a series of 30 personal cases of movable kidney treated by operation.

G. B. Johnson, of Richmond, Va., ⁹⁶_{Feb., '95} reports 17 similar cases. Lafourcade, of Bayonne, ³_{Aug. 21, '95} reports 14 cases of this operation, with 13 cures and 1 death. Among other writers on this subject are W. Stokes, of Dublin ²_{Apr. 20, '95}; W. Cheyne ⁶_{Mar. 30, '95}; H. Gage, of Worcester, ⁶¹_{July 13, '95} and E. Küster. ³³⁶_{July 6, '95}

Vulliet, of Geneva, ¹⁰⁸_{July 1, '95} describes a new method of nephrorrhaphy which he has tried successfully in one case. He fixes the kidney by a loop of living tendon. The following is a description of the operation: An ordinary extra-peritoneal incision was made to reach the kidney. A second incision 8 centimetres in length and having its centre opposite the first lumbar spine was made parallel with and 2 centimetres external to the dorsal spines. The teguments and dorsal aponeurosis were incised and the tendinous slips of the dorsalis longus found. The tendon which is inserted into the first lumbar was chosen, being about the proportions of a stout boot-lace, and usually about 22 to 24 centimetres in length. This was raised by two fingers inserted beneath, and by traction stripped up to its insertion near the shoulder, shreds of muscular tissue being left attached to its free end. A strong stylet was then passed through the muscles between the twelfth dorsal and first lumbar vertebræ into the abdominal cavity and the tendon threaded on this and drawn through. The kidney was then drawn out through the first incision and a stylet passed from below up beneath the capsule along the posterior border. The tendon was threaded through this and drawn downward, re-appearing at the lower part and leaving a free end 4 or 5 centimetres in

length. This was passed outward through the muscles of the abdominal walls and fixed with metal sutures in the wound, the tendon having described the figure 8 in its course. The operation was extra-peritoneal; there was hardly any hæmorrhage, no temperature, and hardly any pain. The wounds healed by first intention in eight days and the patient was shortly afterward discharged completely cured.

R. H. Reed, of Columbus, O., ⁶¹_{Dec. 22, '94} in performing nephrorrhaphy advocates first making an abdominal incision and then, by means of a long needle, passing ligatures from the outside through the tegument and the dorsal muscles into the peritoneal cavity. A hand in the abdominal incision then passes the ligature through the kidney, after which the needle is again brought out through the integument and the ends knotted together. Two or more such sutures may be required. The hand in the abdomen, besides directing the needle, places the kidney in its proper position.

Howitz ³⁷¹_{No. 2, '96} advocates fixing a floating kidney by ligaturing it to the transverse apophyses of the lumbar vertebræ, since these structures are immovable.

Traumatism of the Kidney.

According to Küster, of Marburg, ³_{Apr. 24, '96} traumatism in the renal region cause either lacerations of the renal structure or mobility of the organ. In the male traumatism are more apt to result in lacerations of the kidney, while in the female they usually cause mobility. The author accounts for this difference by the fact that in the female the conformation of the body, the thickness of the adipose tissue, and the protection afforded by the corset break the direct force of a blow and thus guard against lacerations.

Tuffier and Levi, of Paris, ¹¹⁵³_{Apr. 27, '95} review the subject of perirenal extravasations of blood and urine resulting from renal traumatism. The majority of these cases recover as the result of rest and expectant treatment, and consequently such treatment is at first advisable. When, however, the symptoms do not improve under these measures, an incision should be made exposing the seat of injury and such steps taken as the nature of the injury may render advisable. Kölliker, of Leipzig, ³³⁶_{July 6, '95} records a case of rupture of the kidney in which he cut down upon the organ and drained off the extravasation, recovery resulting. Guinard, of Paris, ³⁶⁰_{Oct. 1, '94} reports a case of Blum's in which nephrectomy was successfully performed for persistent hæmorrhage after renal injury.

T. R. Bradford, of London, ²_{May 11, '95} made a series of experiments to determine the changes in the urine and in the general nutrition in an animal with but a fraction of one kidney available for the

discharge of the renal functions. The experiments were carried out on dogs, the ingesta and excreta being determined before and after the operation. The nitrogen was estimated by Kjeldhal's method. A wedge-shaped portion was excised from the middle zone of one kidney and the cut surfaces approximated by sutures; after an interval of some weeks the entire opposite kidney was excised. The results may be summarized as follows: Removal of a portion of one kidney is followed by a variable amount of general atrophy of that kidney and hypertrophy of the opposite kidney, provided the operation be performed in adult animals. Removal of a portion of one kidney only is followed by a slight increase in the amount of urine excreted; this increase is sometimes only temporary, and there are no other ill effects. If, after having excised a portion of one kidney, the entire kidney of the opposite side be removed, the following results are seen: If only some two-thirds of the total kidney-weight has been removed altogether at the two operations, the animal remains in fair health and does not become emaciated. The quantity of urine excreted, however, is greatly increased,—that is, doubled or even trebled in amount. There is no increased excretion of urea. On the other hand, if as much as three-quarters of the total kidney-weight has been removed, then there is a still greater increase in the amount of urine excreted, and in addition there is a considerable increase in the daily urea excretion; the animal emaciates rapidly and dies within a few weeks of the second operation. Excision of a wedge from each kidney is followed by the excretion of a large amount of urine, but there is no increased excretion of urea and the animal remains in good health. Hence, when the renal tissue is reduced to but one-fourth of its original weight, there is not only no diminution in the amount of urine and urea excreted, but, on the contrary, a great increase, the increase in urea being dependent upon rapid emaciation, which is not checked by a liberal diet.

Renal Tuberculosis.

John P. Bryson, of St. Louis, ²⁴⁵_{Nov., '94} discusses the question of surgical interference in tuberculous kidney and records several cases. Regarding the frequency of this disease, he says that, of 174 cases observed by him sufficiently to justify the positive diagnosis of tubercular disease of the urinary organs, only 18 gave unmistakable evidences of involvement of the kidneys. In a majority of these cases of renal tuberculosis the bladder gave the first clinical signs of mischief, and without any exception the lower urinary, and in males frequently the genital, organs were distinctly

involved when first seen ; but in a certain proportion of the cases the middle urinary passages were infected in a manner to fully justify the belief that the disease came from above.

The author calls attention to the fact that in renal tuberculosis both organs are frequently more or less affected, and that, consequently, nephrectomy in these cases is especially dangerous ; and he agrees with the majority of authorities on this subject, that it is apt to be disappointing in its results. A. Pousson, of Bordeaux, ³_{Aug. 17, '95} questions whether surgical intervention is legitimate in primary renal tuberculosis.

Tumors of the Kidneys.

Malignant Growths.—Hildebrand, of Göttingen, ³⁰¹_{B. 40, Nov. 1, 2, '95} analyzes 13 cases of renal tumor operated on by König. Seven cases occurred in children under 9 years of age, and of these latter cases 5 were sarcoma, 1 a congenital cyst with sarcoma, and 1 carcinoma ; 6 of the 7 were cured by operation, but a recurrence of the growth occurred in every instance. In none of these infantile cases was there hæmaturia. Of the 6 remaining cases, in adults, hæmaturia was present in all. In 5 the kidney was removed through the loin, in 1 through the abdomen ; 3 of these nephrectomies were fatal, and in the 3 which survived only 1 escaped without a recurrence of the disease.

Thorkild Rosing, of Copenhagen, ²²⁶_{B. 49, H. 2 ;} ⁹⁶_{Sept., '95} in an article on this subject, states that, since the first malignant tumor of the kidney was removed by Kocher, eighteen years ago, the operation has been done 150 times, with a mortality from the operation of 50 to 66 per cent. before 1890, and of 20 to 25 per cent. since then. Wagner has found 17 cases which have lived a year or more after the operation, but many of these have died of recurrence at a subsequent date. The large mortality has been due to the fact that the diagnosis was not made early enough, the operation being undertaken when the tumor had reached a large size and formed numerous adhesions. The early diagnosis of these tumors is a chapter which surgeons have neglected.

Clinically the tumors may be divided into the following three groups: 1. Cases in which a palpable tumor is the first and only symptom. Cases of this kind are not rare, but the diagnosis during the early stages is difficult or impossible. The tumor usually begins in the suprarenal capsule or the upper part of the kidney and reaches a large size before it is discovered ; moreover, it may be mistaken for multilocular cystoma,—a condition in which operation is contra-indicated, as both kidneys are affected. 2. Cases with hæmaturia and a palpable tumor. Typical cases of this kind

are easy to diagnose, but they are rare. They are frequently complicated with attacks of renal colic; the urine contains a large quantity of inorganic matter and crystals, making the differential diagnosis from nephrolithiasis very difficult, especially as the kidney is also enlarged in that disease. 3. Cases of hæmatinuria without a palpable tumor. The early diagnosis presents great difficulties, but it is of the utmost importance, as tumors of this class are usually operable. Hæmorrhage from the bladder can be excluded in that the blood is more intimately mixed with the urine and instruments passed into the bladder cause no fresh hæmorrhage. The diagnosis is best made by the microscope, as the urine deposits a layer of yellowish-gray granular matter composed largely of round or spindle cells which have undergone fatty degeneration.

X. O. Werder¹⁹_{Dec. 29, '94}; T. K. Dalziel, of Glasgow²¹³_{Dec. '94}; H. Krentzmann, of California¹⁴⁷_{July, '95}; J. J. Buchanan, of Pittsburgh¹⁹_{Apr. 20, '95}; L. H. Dunning, of Indianapolis,⁴⁶_{Feb., '95} and H. Allingham, of London,²²_{Mar. 6, '95} are among those who report successful nephrectomies for malignant disease in young children. Dunning states that his case died nine months afterward from recurrence of the disease. Most of the other cases are simply reported to have recovered from the operation.

J. B. S. Holmes, of Atlanta,¹⁴³_{June, '95} reports the death of the child successfully operated on about eleven months previously. (See ANNUAL for 1895.) In this instance death is attributed to acute pneumonia, but no mention of an autopsy is made. R. Abbe, of New York,⁹⁶_{Aug., '95} reports that his two infantile cases of nephrectomy for malignant disease (see ANNUAL for 1895) are still well three and two and one-half years, respectively, after the operation. Malcolm²_{Mar. 30, '95} (see ANNUAL for 1895) reports his case of nephrectomy for adenoma, in a child of 23 months, as still well and showing no signs of recurrence two years and four months after the operation.

Piqué, of Paris,³_{Oct. 10, '94} reports a case of anuria due to compression of one ureter by a cancerous growth associated with reflex paralysis of the secreting function of the kidney which was not involved. In this instance an incision into the pelvis of the kidney whose ureter was blocked, thus relieving the tension, was immediately followed by a restoration of the function of the opposite organ. The author believes that anuria of this nature generally yields as soon as the tension due to the obstruction is removed.

Reverdin, of Geneva,⁴⁸_{Nov., '94} successfully removed a 48-pound fibroma which had developed in the tissues enveloping the kidney.

W. Anderson, of London, ⁶_{Apr. 27, '95} reports the successful removal of a carcinomatous kidney which was peculiar on account of its slow growth, there having been a noticeable tumor for six years.

W. N. Swift, of New Bedford, ⁹⁹_{Apr. 18, '95} and H. Coutagne ²¹¹_{July 28, '95} both report successful nephrectomies in adults for malignant disease.

J. Knowsley Thornton, of London, ⁶_{Jan. 26, Mar. 9, Apr. 6, June 8, '95} reports his second series of twenty-five cases of abdominal nephrectomy for various conditions and shows excellent results. He gives details of many of his cases.

SYPHILIS.

BY THE CENTRAL EDITORIAL STAFF.

SUBMITTED FOR COMMENTATION TO

J. WILLIAM WHITE, M.D.,

ASSOCIATE EDITOR,

PHILADELPHIA.

History.

AN interesting discussion upon the history of syphilis took place at the meeting of the German Dermatological Reunion. Virchow ²²_{Dec. 18, '95} stated that, notwithstanding all the labor bestowed upon it, the origin of this disease is still shrouded in mystery. Some inquiries into traces of pre-Columbian syphilis in America seemed as if they would shed some little light. On certain earthenware vessels taken from Peruvian graves were drawings which left it doubtful whether the disease portrayed was leprosy or syphilis. It was also very difficult to determine the period of the grave, as one could not tell with certainty whether it belonged to a period preceding or the century immediately following Columbus. There were also words of the pre-Columbian era that were supposed to have reference to the disease. The human remains of the period were of the highest interest. Evidences of syphilis or lepra were supposed to have been met with in mummies from Peruvian graves. Bony remains were of the most importance, as they had best withstood the work of time.

Specially careful observation had been made on bones found in Kentucky and Tennessee, but no change had been found characteristic enough to admit of a certain conclusion as to syphilis. A generation ago Virchow himself had discovered bony prominences similar to those of the American graves in the bones of the cane-bear. On account of the likeness to human arthritis deformans, he had named it "cane-gout." There was nothing resembling it about the bear of the present day. Considering the resemblance between the American bone and those of the cane-bear, the conclusion might easily be drawn that the cane-bear suffered from syphilis,—a conclusion that was scarcely tenable. A skull from an American grave with numerous porosities very much

resembled one partly destroyed by the development of syphilitic gummata; but the two conditions could not be confounded, although it would be difficult to describe the differences. But he found earthy masses in the porosities of the American skull and in them worms and their embryos; so that the conclusion had to be drawn that the changes were posthumous. In order to demonstrate syphilis hyperostosis must be proven. For syphilis the deposits on bone that led to increase in bone-substance were characteristic when it was difficult to determine where the old bone ended and the new began. Bony cicatrices following gummatus periostitis were also characteristic. How careful one ought to be in coming to a conclusion was shown by the fact that changes somewhat similar to those produced by syphilis were also caused by phosphorous poisoning, as shown by the marked hyperostotic thickening produced in hens by phosphorous feeding.

Pachmann stated that the opinion that syphilis had originated in America had been quite abandoned, although a few authors could yet be found who claim this locality as the home of the disease. There is no doubt that the disease became epidemic and wide-spread during the sixteenth century, and that many of the earnest investigators associated its rapid distribution with the discovery of America. From investigation we have no testimony of Columbus or his associates having any knowledge of this disease, nor do the medical men who followed him on a later visit make any special note of such a disease. It is admitted, however, that the sailors who accompanied Columbus were afflicted with syphilis, but we find from closer inquiry that these men had relations with Indian females before joining Columbus. We may conclude, therefore, that the disease was not in America before the Europeans arrived. Another point in favor of this contention is the seeming spread of the disease from occasional records about the end of the fifteenth century. It appears to have visited Europe about 1492, but whether as a new disease imported or as a milder disease aggravated is not yet clearly established.

Bacteriology.

The various phases of the streptobacillus of soft chancre are discussed by P. G. Unna.⁴⁷⁹ According to the opinions of Ducrey, Krefting, Rivi re, Mermel, Nicolle, Colombini, Audry, Dubreuilh, and Unna himself, the streptobacillus discovered by him in the tissue of chancre is identical with the bacillus found by Ducrey in the pus. The slight difference in size is explained by the different stage of the organism, the bacillus in chains in the tissue being generally somewhat finer and longer than the

bacillus of pus. The difference in form is explained also by the diversity of the stage, the bacilli with angular extremities representing the phase of active attack upon the tissues. As to the staining properties, both fail to stain by Gram's method and both show a predilection for methyl-violet. The homogeneous coloring of the streptobacillus and the double points of the pus-bacillus are also explained by different phases.

The growth in chains, extremely important, is characteristic only of the streptobacillus of the tissue, but in an intermediate area—that is, the surface of the ulcer, and especially in the crusts upon it—all the transitions between the chains and the masses of bacilli in the pus may be found. True phagocytosis does not exist in the two forms; the regular swallowing up of the bacilli in chains, dispersed by the leucocytes on the surface, is not to be regarded as an attack of the leucocytes against the bacilli. It is rather a means of transportation and inoculation of the virus.

Nicollé, Colombini, Dubreuilh, and others justly attach importance to the fact that no one has yet been able to cultivate this bacillus in any known medium, either from the pus or the tissue. This reserve must be admitted; but if artificial cultures can be made it is possible that there may be a difference in these also, owing to the attenuation of the pus-bacillus.

Unna has since 1892 been able to demonstrate the streptobacillus as being constantly present in the tissue, while other authors assert that Ducrey's bacillus is constantly present in the pus.

In soft chancres the streptobacillus is found at the onset descending through the epithelium and between it and the derma, the former being, as a consequence, lifted up. While the chancre remains small the streptobacillus is found in a superficial position and almost parallel with the surface. In old chancre with ragged base and excavated edges the streptobacillus is found to have proliferated vertically in the base, corresponding to the hollow places, in which it is found in long chains. Unlike ordinary saprophytes, it goes beyond the necrosed area into the healthy tissue, and its emigration is immediately followed by necrosis of the derma; and a fact which favors the theory of its causing necrosis is that the blood-vessels of the skin are extremely dilated, the skin containing considerable blood and consequently opposing great resistance to necrosis. Streptobacilli are never found in the blood-vessels in soft chancre, which might be supposed from its local and benign nature. The absence of the streptobacillus from all other analogous ulcerative processes, as hard chancre, secondary and tertiary ulcers, genital herpes, various forms of impetigo, ecthyma, varicose

ulcer, is another point in favor of its etiological importance in syphilis.

Gaucher, Sergent, and Claude²⁸⁷_{Nov. 7, '95} report two cases of suppurating inguinal adenitis,—one in the course of acute urethritis and the other in metrovaginitis. The pus from the bubo in each case was free from microbes, and cultures from one case remained sterile.

Eliasberg²⁴⁵_{'94} admits that Ducrey's bacillus is the pathogenic agent of soft chancre, but claims that it does not pass into the gland in a virulent state, or at least that it is not the direct cause of buboes, which are rather due to the soluble products of the microbe transported into the glands by the leucocytes.

In a paper by C. F. Griffin, of San Francisco, Cal.,¹⁴⁷_{Aug., '95} the conclusion is reached that the substance or substances that produce the cirrhosis of syphilis probably are hydrocarbons, more or less closely related in chemical structure to ethyl. The most probable source of these alcohols of tertiary syphilis is in the breaking down of the molecule of the secondary toxin. The latter, as already mentioned, is probably a large molecule belonging to the proteids, constructed by vital action of micro-organisms, and composed, in part, at least, of hydrocarbons of the ethyl type, grouped together in such a manner as to resemble the structure of atropine. This huge molecule, obtained by the body from the dead micro-organisms, is broken down by the natural forces of the system, and the simple substances from which it was built up are liberated. These simple substances are the hydrocarbons, to which reference has already been made. Under conditions not well understood, but which appear to prevail, especially during intra-uterine life, these hydrocarbons produce their physiological action. This action results in the diffuse, interstitial, visceral affections. Not very rarely the same action occurs in adults, and, as a rule, results in the development of such disorders as general paralysis and tabes dorsalis.

In the discussion R. L. Rigdon said that Griffin's theory was peculiarly his own. He holds that the chancre is due to the syphilitic toxin alone, that the secondary lesions are due to mixed infection, and that the tertiary lesions are produced altogether by the toxin in an altered state. For infection one must take the secretion containing the original poison, which limits the time within which the disease can be transmitted.

F. Parkes Weber, of London,⁵_{Nov., '95} expresses the opinion that when the discovery of the real microbe of syphilis takes place, as it must some time, the microbe will almost certainly be found present in the tertiary as well as in the primary and secondary manifestations of syphilis, though in the tertiary period it will

probably be found almost completely localized to the lesions which it produces. On the other hand, in the supposed sequelæ of syphilis, such as *tabes dorsalis*, the microbe will probably not be found present, and a clear demarkation will thus be established between these supposed "post-tertiary" or "quaternary" manifestations of syphilis and the true tertiary lesions.

Many considerations are in favor of the view that gummata are caused by the local action of a microbe. He advances an argument in favor of this view, which has not yet, as far as he knows, been brought forward. It must be taken only for what it is worth, but, as fresh evidence, may be of provisional use, until the question be finally settled by the discovery of the real microbe.

Lardaceous disease is acknowledged to occur in syphilitic patients at times without any suppuration, but besides this fact there exists another curious connection between syphilis and lardaceous disease,—namely, that a localized lardaceous formation in the neighborhood of visceral gummata may sometimes be recognized; the latter occurrence, although hardly noted by authors, is very striking when observed.

In human beings lardaceous disease hardly occurs without definite suppuration except in cases of syphilis. Krawkow⁸⁵⁴
May 20, '95 seems to have shown that when it arises from suppuration it is due to the microbes of suppuration. There seems to be little doubt that it occurs sometimes in cases of syphilis when there has been no suppuration at all or only very slight suppuration; it seems, therefore, not unreasonable to suppose that in such cases of syphilis the lardaceous formation is due likewise to a microbe, although not a pyogenic microbe,—namely, to the as yet undiscovered microbe of syphilis.

The occasional localization of the lardaceous change in the neighborhood of syphilitic gummata may be taken as further evidence both that gummata are due to the local presence of the microbe of syphilis (whatever the microbe may ultimately turn out to be), and that this microbe has the power of causing lardaceous disease without the help of pyogenic microbes. This further evidence depends on the fact, as pointed out below, that, if these theories be accepted, the localization of lardaceous formation in the neighborhood of syphilitic gummata can easily be explained, whereas it cannot be so easily explained by any other theories.

Briefly, the author endeavors to show how lardaceous formation in the tissues, when occurring in association with active tertiary syphilitic manifestations, and especially the lardaceous formation occurring in the immediate neighborhood of gummata, may be taken as additional evidence of the already probable view

that active tertiary syphilitic manifestations are caused by the presence of a specific microbe at the site of the lesion. The conclusions which appear most probable may, he believes, be summed up thus:—

That there is a specific microbe of syphilis, the local presence of which is the cause of the tertiary lesions of syphilis; that the metabolic products of this microbe have, like those of some other microbes, such as the staphylococcus pyogenes aureus and the bacillus pyocyaneus, the peculiar property of producing lardaceous formation in the tissues of the hosts.

[The clinical evidence still seems to be almost conclusive of the absence of a specific microbe in the tertiary lesions of syphilis. Their non-contagiousness and non-transmissibility by inoculation or by heredity, their want of symmetry, etc., strongly differentiate them from the earlier lesions of syphilis and from the whole group of diseases due to existing and active microbial infection. It is, of course, not impossible that some forms of bacterial life may be found in or near gummata, nor should it be dogmatically asserted that these microbes cannot be the essential cause of tertiary phenomena; but that they are always present or are essential has certainly not been proven.—J. W. W.]

Methods of Contamination.

Albert Lucas, of Birmingham, Eng., ^{Dec. 1, '94} reports the case of a mother infected with primary syphilis from her own syphilitic child. The patient had three ulcers on her breast, and each of them presented characteristic signs of hard sores. The sores were situated about an inch from the nipple and extended nearly two-thirds round the breast. On examining the baby which she was nursing he found that it had ulcers on the mouth, the snuffles, and condylomata on the anus, with the well-marked *café-au-lait* complexion. The baby was 8 months old. The mouth had been sore for two months. The ulcers on the mother's breast had appeared one month later. She was 31 years of age, had been married thirteen years, had had eight children, of whom three had died at the ages of $4\frac{1}{2}$ years, 1 year, and 9 months. The five living were quite healthy and she had had no miscarriages. She had always had good health herself. Her husband (a laborer), she stated, had nothing the matter with him. She was treated with lotio nigra and hydrarg. c. creta, gr. ij three times a day. On examination the next week the chancres were cleaner and more typical. On the arms and chest a secondary rash was appearing and she had some pharyngitis. Unfortunately, she did not attend again. This case, he thinks, deserves publication as an

exception to the recognized law of Colles, that a mother cannot be infected by her own syphilitic child.

[The alleged chancres were, possibly, ulcerating mucous patches, and the source of infection was, at any rate, in all probability not the child. The literature of syphilis is full of these loosely observed and carelessly reported cases, very few of which are worthy of credence. When a general practitioner thinks he has a case of exception to Colles's law his first step should be to call a consultation of the most expert syphilographers available and ask for their help in an exhaustive and scientific investigation of all the phenomena. When this is done all over the world we shall have data for estimating the frequency of true exceptions to this practically invariable law.—J. W. W.]

George Ogilvie, of London, ²_{Dec. 15, '94} states that Colles himself, in 1837, gives the history of a case in which a mother was infected by her own syphilitic child, to show how easily mistakes in this direction might be made; and Diday, in 1854, proved that in the five cases of apparent exceptions to Colles's law then known—Ambroise Paré, Fucen, Bertheraud, Bertin, and Cusack—the syphilis of the child was not congenital, and was, therefore, communicable to the mother. A minute examination of the cases published since then—in number about fifteen—shows that in most of them the possibility of the same error has not been excluded with sufficient definiteness, while only a few of them will stand a more searching criticism. Among the latter, Ranke's case will always stand in the front rank, and the possibility of these exceptional occurrences is further demonstrated by such well-observed cases as those of Rinnecker and Bergh, in which a mother contracted a primary hard chancre of the labium, followed by the usual secondary symptoms, shortly after giving birth to a syphilitic child. Both classes of cases show that a mother who has transmitted syphilis from father to child is, in spite of this, not always immune to syphilitic infection, and, therefore, liable to infection by her own child or any other bearer of the virus. The complicated laws of immunity—of which we are only learning the rudiments—can only, where experimental research is impossible, be ascertained by careful clinical observation. No conclusions whatever can, in his opinion, be drawn from such an incomplete case as that described by Lucas.

Edward Cotterell, of London, ²_{Jan. 5, '96} also failed to see that Lucas has produced any satisfactory evidence to prove that the child in question was suffering from hereditary syphilis, and does not believe that, up to the present, a case has been quoted which, upon thorough investigation, has proved an exception to Colles's plan.

Feulard³¹_{June 15, '95}⁴⁹_{Nov.} showed, at the French Dermatological Congress, a girl aged 19, who had come to Paris to act as a wet-nurse, and who actually officiated for one month as wet-nurse in a family. During this month her own child became ill with undoubted syphilis, whereupon she again suckled it at the breast. The most careful examination did not reveal the slightest signs of syphilis, and the author states that undoubtedly this was a case according to the law of Colles. The woman gave birth to a syphilitic child and did not exhibit the slightest trace of syphilis.

At the meeting of the Polish Medical Congress in Lwów Szadek⁶⁷³_{Feb., '95} endeavored to refute the theory that the syphilitic fœtus may infect the mother. He claimed that an examination of the mother in such cases shows that the lesions are not so recent as if the disease were acquired from the fœtus. No facts have been brought forward to prove that solid substances or formed elements can pass from the fœtus through the placenta into the maternal circulation; and, as at the present time it is admitted that syphilis can be transmitted only through the medium of formed elements, it is highly improbable, in his opinion, that the child in the womb can communicate the disease to its mother.

According to G. R. d'Aulnay, of Paris,⁹⁹⁶_{Feb. 10, '95} text-books on syphilis teach that no fluid or physiological secretion from a syphilitic patient possesses specific virulence. On this point he agrees, but believes that it is not correct to include as a physiological secretion the spermatic fluid with its spermatozoa, and to consider this as non-contagious. In his opinion, the product of the testicle is not a product of secretion, nor is the testicle a gland. The latter serves only to produce anatomical elements which lead to the generation of spermatozoa,—a phenomenon which in no wise resembles the secretion of the glands. Thus, nothing is more incorrect than to regard the testicle or the ovary as a gland. Both belong to the group of non-glandular parenchyma, and differ as much from the glandular parenchyma as these do from tissue properly speaking. Semen is not in itself a product of secretion, but a collection of secretions in which float the detached embryonic cells from the walls of the testicular canals. Examination at the moment of ejaculation shows that the semen is composed of embryonic male-cells (spermatozoa) coming from the testicle, mixed with secretion from the follicles of the deferent canal, secretion from the seminal vesicle, from the prostate, and from Cowper's gland. The testicle, therefore, having as its only object to cause proliferation and segmentation of the embryonic cells of its parenchyma, is not a secreting gland, and it is an error to speak of the secretion of semen. From this stand-point, if the semen is not a

product of secretion, it is probable that it does not possess the benign nature of glandular secretions, but that the spermatozoa, as much as the embryonic cells, must be considered as a constituent part of the infected organism, more than sufficient to cause, under certain special influences, infection of the ovum and, consecutively, of the mother. As is known to-day, the ovum, which is the type of the cell, is always infected in syphilitic women.

[It has been abundantly proven that the semen of syphilitics is not inoculable in the absence of mucous patches of the urethra or other suppurating or ulcerative lesions. The fact that it can convey the disease through the spermatozoa is one of the mysteries of heredity as yet unsolved. But, as regards all other forms of transmission, the semen is as innocuous as the tears or the milk.—J. W. W.]

F. D. Fisher, of Manchester, Eng., ^{Feb. 16, '95} reports a series of ten cases of syphilis acquired in childbed and exhibiting tertiary phenomena. The unhappy victims were not in the first instance attended by medical men, but were all delivered by the same midwife, who had been inoculated on the hand with syphilis while nursing a prostitute. All the confinements took place in 1882,—six in August, three in September, and one in October. There is no reason to suppose that the midwife ceased to follow her vocation after the latter date, and it is certain that the cases which were traced did not include all that occurred. In none of the cases could any history of inherited or previously acquired syphilis be obtained.

The tertiary symptoms presented by the female patients did not include any dependent on implication of the brain or spinal cord. The cranial nerves were all examined and found to be normal, except the second and, perhaps, the eighth. The senses of taste and smell were intact; there was no paralysis of the muscles of the eyeball, and the pupils were equal and normal in every case, except the husband of one patient, who had the Argyll-Robertson pupil. There was no distinct evidence of gummatous growth in any part of the body. In three cases the faces of the patients were extensively marked by scars resulting from the dermatitis associated with tertiary syphilis. The disease being acquired in childbed, the puerperal period was continuous with the primary symptoms; hence none of the cases were treated in hospital till (in most instances) the tertiary symptoms developed. The midwife, who is still alive, knew the nature of the sore on her finger. She was tried at the Leeds Assizes in February, 1883, and was sentenced to twelve months' imprisonment with hard labor.

Bergasse ²⁴³_{Mar., '95} reports the transmission of syphilis by tattooing

in seven soldiers who had been tattooed by a comrade with mucous patches in the mouth. Fine needles were used for the purpose, dipped in China ink, which should have been diluted with water, but which the man diluted with his saliva, moistening both the needles and the tattooed portion of the skin in a similar manner. A case of the same kind is recorded by Cheinisse,²⁸⁶
Jan., '95 who states that Tardieu and Robert have encountered veritable epidemics of syphilis in soldiers produced by tattooers, and the fact of communication by means of the saliva tends to explain the origin of otherwise obscure cases of extra-genital chancres.

Fournier,¹⁴
May 15, '95 considers the modes of infection of syphilis in medical practice, either as transmitted by the physician or as conveyed to him, and cites, as instruments of contamination, knives, bistouries, lancets, instruments for cupping, scarificators, stylets, specula, toothed forceps; catheters, especially that of Itard for catheterization of the Eustachian tube; tongue-depressors, laryngoscope, ophthalmic and dental instruments, dressing materials, etc. He particularly calls attention to the dangers of tongue-depressors, wet-cups, and holders for nitrate-of-silver stick. In a later communication,¹⁴
May 19, '95 he states that the gravity of professional syphilis in physicians has already been demonstrated, and he attributes this gravity to three causes: (1) the physician is a patient morally depressed by the presence of the disease, owing to the fact that he understands its seriousness; (2) the physician is almost always overworked intellectually and physically; (3) physicians generally make bad patients.

Fournier,²¹²
Oct. 10, '95 among other instances of extra-genital chancre seen by him, mentions a chancre of the knee, in a child 4 years old, at the site of an abrasion due to a fall. A woman who happened to see the child fall applied to the wound a square of adhesive plaster that she moistened with her tongue. Four weeks later a chancre developed at the spot, followed by severe syphilis. Fournier also treated a woman who contracted the disease in a bathing establishment by using a hair-glove. Contagion may also occur through mending the linen of syphilitic patients. Another little-known, but frequent, source of contagion is through public water-closets, the buttocks or thighs being then the seat of chancres. A fact which facilitates such contagion is that many patients suffering from the disease go to such places to change the dressings, and the latter soil the seat of the closet and thus cause the spread of the disease.

An editorial writer,⁸⁰⁶
Oct., '95 states that flies and fleas may serve as vehicles of infection in this disease. This is demonstrated by an experiment in which flies were placed in momentary contact with

the bacillus prodigiosus, and then allowed to escape and roam about for some time in a large room. On being recaptured and made to walk over slices of sterilized potato, vigorous growths of the bacilli were found to develop wherever their feet had touched. The writer cites the interesting case of a physician who had become the subject of syphilis; he was covered with an eruption, and there could be no question as to the diagnosis of the disease. On careful examination of the genitals no trace of the primary lesion could be found. A dusky spot, however, was found on one leg which looked like the remains of a boil. The dates fitted exactly with the supposition that this had been the primary sore. The history of the sore was that it had followed a flea-bite which he had subsequently scratched. As the doctor had retired from practice and never had anything to do with syphilitic patients, it was not in the least probable that he had inoculated the bite by scratching.

J. Henry Dowd, of Buffalo, ^{June, '96} 245 endeavors to explode the theory that syphilis is not transmissible after four or five years, instancing the case of a man whom he has known for ten years, seen frequently, and positively knows he never had anything except a gonorrhœa some three or four years ago. He also denied having intercourse in the past year with any but a woman whom Dowd has known for two years and a half. She called on him about that time, having nocturnal pains along the crest of tibia with swellings on the same (gummata), headaches, and the characteristic coloring of a past rupial eruption. There was no doubt about the diagnosis, as she was relieved at once by iodide of potassium, mercury, and Fowler's solution. She vividly described a sore she had on the genitals (nine years before), hair coming out, skin eruption, headaches, etc., and he is not in doubt but this was the infection. He does not doubt the man's word as being with no other woman in the past year, and she has certainly not had a second re-infection; but is it possible for syphilis to be contagious twelve years after the initial lesion? The woman denies having had intercourse with any one else for a long time previous to the ulcers appearing. He has, furthermore, asked her if she were sure about being with no one else, and she stoutly denied it. This woman, at this late day, twelve years, is having active tertiary symptoms. She complained of pain on defecation and a bloody, muco-purulent discharge and tenesmus. Examination revealed a small ulcer internal to the inner sphincter.

[A few cases of the late transmission of syphilis have been reported by competent observers,—Landouzy, Fournier, Hardy, and others,—but they are so rare that even their testimony is to

be regarded with suspicion, not of their truthfulness, of course, but of the correctness of the premises from which they argued. I have never seen a case of direct transmission or of transmission by inheritance occurring after five years from the time of the infection.—J. W. W.]

S. Holth⁶⁷³_{Sept., '94} reports three cases of auto-inoculation of chancre. In the first case a sailor, aged 20 years, presented himself with a sclerosis of the internal lamina of the prepuce, a maculo-papular exanthema of the trunk and extremities, and an indurated ulceration, of the size and shape of a bean, occupying the inferior part of the right superior eyelid, extending to a part of the conjunctiva tarsi. The patient related that the ulceration of the eyelid had developed after a foreign body had lodged in the eyelid for about a week, the patient constantly rubbing the eye with his fingers, which he also employed to feel whether the ulceration on the prepuce had become indurated. The second case was that of a man, aged 26 years, who had scratched himself with his nails on the chest while suffering from an indurated chancre in the sulcus coronarius and roseola of the trunk; a hard chancre appeared on the chest. The third case was that of a peasant, aged 25 years, who had two small indurated ulcerations of the sulcus coronarius. While these two ulcerations were healing, the patient, without any fresh infection, contracted a new indurated ulceration close to the two old ones. No roseola had as yet developed. (Report of Corresponding Editor Holger Mygind, Copenhagen.)

A case of syphilitic re-infection was seen by Éraud, of Lyons, in a man 36 years old.²¹¹_{Dec. 9, '94} There were (1) a hard chancre with inguinal bubo, roseola, and secondary accidents; (2) complete absence of all after-effects of secondary and even tertiary accidents, and (3) a new hard chancre, following suspicious coitus, accompanied by characteristic adenopathy, headache, and mucous patches.

Primary Syphilis.

Under the name of chancre-like gonorrhœal erosion Leloir¹²¹_{Apr., '95} describes a sore extending around the orifice of the meatus, which may, in certain cases, attain the size of a five-cent piece and occasionally of a dime. Its base is muscular tissue, red, but sometimes, on the contrary, grayish-yellow or opaline. It is superficial, plane or slightly elevated, and sometimes presents an hæmorrhagic point indicative of alteration of the summit of the papillæ. The base of the erosion may be the seat of a pronounced induration, deep, circular, surrounding the meatus and producing in this situation the sensation of a very thick disc of hard rubber. It is but

slightly painful either spontaneously or upon pressure. At the moment of micturition, however, it is the seat of sharp and, in certain cases, excruciating pain. This erosive and purulent lesion heals readily under the local use of borated baths and the application of boric-acid ointment, with or without salol or hydrochlorate of cocaine. The bath and the dressing should be used anew after each passage of urine. A pledget carrying the ointment should be placed within the lips of the meatus. The induration does not survive the cure of the erosion, and this constitutes the diagnostic point between a chancre-like erosion due to gonorrhœa and infecting chancre of the meatus.

George K. Swinburne, of New York, ¹_{Nov. 30, '95} presented a case of urethral chancre. There had been a urethral discharge after an incubation period of seven days, but no gonococci had been found. The patient then complaining of pain during irrigation of the urethra, a more searching examination had been made, with the result of finding a chancre in the fossa navicularis. A microscopical examination at this time had shown the presence of rod-shaped bacilli with clubbed extremities, together with micrococci. The latter had been obtained in pure culture by sterilizing a portion of the surface of the man's abdomen and implanting the organisms there under a watch-crystal. There had been no other lesion in the urethra, and the ulcer had healed readily under astringent applications.

W. S. Gottheil, ¹_{Sept. 28, '95} in a paper on pseudochancre before the American Medical Association, draws the following conclusions: 1. There is no characteristic sign, and no characteristic combination of signs, that enables us to diagnose a chancre from the lesion alone. 2. Only the advent of other syphilitic symptoms enables us to form an opinion as to the presence of systemic infection. 3. Almost all the alleged cases of syphilitic re-infection are of doubtful validity, and most of them are pseudochancres belonging to one or the other of the above varieties.

O. Palmer ⁶⁹_{Jan. 31, '95} presents a study of the stigmata of primary syphilis, based on the examination of six hundred syphilitic prostitutes. He states that, during the two years following the infection, most of the phenomena necessary for diagnosis may be found in women who are badly or insufficiently treated. Chlorosis was noted in 80 per cent. of his cases, adenopathy in 70 per cent., hypertrophic cicatrices of the tonsils in 66 per cent., areolar alopecia in 35 per cent., leucoderma in 70 per cent., pigmentations left by the roseola in 55 per cent., and cicatrices of flat and hypertrophied condylomata of the perianal folds in 50 per cent. At the end of the second year, however, all these lesions become

modified and tend to disappear very rapidly; so that toward the end of the third year leucoderma only is to be met with. The author therefore believes that, where the foregoing stigmata are met with together, a diagnosis of recent syphilis is warranted, the more so as the stigmata are the more numerous.

A case of multiple chancres was presented to the New York Academy of Medicine by F. Tilden Brown.²⁴⁵
Apr., '95 The patient stated that one month previously he had had a suspicious exposure, and a few days ago he noticed some reddish spots on the prepuce. On examination five lesions were found,—two in the coronal sulcus, on each side of the frænum, and three on the mucous surface of the prepuce, about one-eighth of an inch behind the corona. The lesions were small, with a slightly raised area of tumefaction which scarcely imparted the sensation of induration. The left inguinal glands were enlarged and indurated. When the patient returned, nearly a month later (February 9th), one of the lesions had disappeared; the remaining four were very characteristic, and an additional lesion had made its appearance on the left side of the meatus. At this time the patient also presented a lenticulo-papular eruption on the abdomen and sides. There was also a slight urethral discharge.

In the discussion R. W. Taylor called attention to the fact that in some cases of supposed multiple chancres the lesions are merely the result of a simple inflammatory process, such as balanitis or balano-posthitis, or are due to irritative applications. They consist of little œdematous patches, which readily disappear under treatment. With true chancres, on the contrary, there is a small round-cell proliferation, which in the florid stage of the disease tends to luxuriate rather than to undergo retrogression. John A. Fordyce argues that the pathological investigations thus far made have disclosed nothing which is absolutely characteristic about the initial lesion of syphilis. There is a round-cell infiltration which differs little from that found in any inflammatory condition. In syphilitic lesions there is some special virus with which we are not yet acquainted. Taylor called attention to one characteristic of syphilitic lesions,—viz., that the inflammatory process rapidly extends along the course of the vessels, surrounding them with a coat-sleeve-like arrangement.

[The microscopical diagnosis between chancre and any chronic inflammatory lesion with round-cell infiltration is at present practically impossible. I have endeavored in this manner to forecast the character of doubtful sores in cases of non-venereal origin, but have come to believe that at present neither the gross appearance, the microscopical section after removal of the sore,

nor the culture of its discharge will afford a sound basis for diagnosis. Time alone furnishes this, in some of these cases, by developing the lymphangitis and adenopathy, which are conclusive.
—J. W. W.]

Petrini, of Galatz, ¹¹⁵³_{Nov. 2, '96} describes a case of syphilitic chancre without inguinal adenopathy, in an officer who presented on the prepuce a dark-red ulceration with thick edges and indurated base. The examination of the patient rendered it easy to ascertain that there was no tumefaction of the inguinal glands. Petrini prescribed bichloride of mercury. Three weeks later roseola appeared, and the patient, who complained of sore throat, showed mucous patches on the tonsils; there was also cervical adenopathy. The ulceration was thus syphilitic, and the author believes that the absence of tumefaction of the glands was due to the fact that the syphilitic virus had penetrated into the organism by another way than the lymphatics. Mastro Simone ⁵⁰⁷_{V. 3, No. 2} states that from statistics made at Palermo soft chancres and buboes are chiefly observed during the hottest six months. When observed in winter it is when the weather is less cold than usual.

Extra-genital Chancre.—Fournier ¹⁶⁴_{Dec. 25, '95} observes that syphilis following extra-genital chancre may present at times unusual features of gravity, but that, if a very large number of cases be collected, it is seen that its severity is the same as that of syphilis of genital origin, depending much less on the localization of the chancre than on the conditions of the soil upon which it develops.

Voll, of Würzburg, ³⁴_{Jan. 29, '96} reports a case of syphilis in a woman in which the primary lesion was situated on the back over the tenth rib, about eight to ten centimetres from the middle line.

A case of syphilitic chancre of the eyelid is reported by James Hinshelwood, of Glasgow, ²¹³_{Sept., '94; Feb., '95} as among the rarities of ophthalmic practice. H. Coppez, of Brussels, ⁸⁶⁸_{Nov. 3, '94} observed a case of double hard chancre of the upper eyelid. John B. Shober, of Philadelphia, ⁹⁶_{Sept., '95} contributes an article on chancre of the tongue, with a report of four cases.

Kopytowski ⁶⁴⁰_{Sept., '94} ⁶⁷³_{Feb., '95} describes a rare case of chancroid of the outer surface of a finger on the right hand. The ulnar gland was enlarged and painful on pressure and the cuticle became red. The ulcer cicatrized after local treatment with iodoform, and the bubo yielded to applications of iodine and compresses. (Report of Corresponding Editor Szadek, of Kief.)

Gaston R. d'Aulnay ⁹⁹⁶_{Dec. 10, '95} has collected all the cases of extra-genital chancre, of both sexes, published during the past few years, and united in the following table all isolated cases with the statistics already given by Cooper, Nivet, Peters, Rona, Van Broich,

Bielonsow, Duncan Bulkley, Veslin, Feulard, Morel-Lavallée, Stourme, Salsotto, Neumann, Vedenski, Rassler, Popelów, Krefting, Bayet, and Desmet:—

LIP.		Men.	Women.			Men.	Women.
Upper lip	179	129		Malar region		1	2
Lower lip	153	157		Neck		3	14
Labial commissures	32	19		BREAST.			
Not specified	146	92		Nipple		0	17
TONGUE.				Base		0	4
Point	3	2		Areola		0	21
Edge, anterior portion	2	3		Not specified		3	328
Dorsal surface, anterior	3	0		Anus		25	65
Dorsal surface, posterior	2	0		Perianus		2	5
Not specified	56	39		Abdomen		42	7
Tonsils	66	63		Buttocks		1	6
Gums	10	7		Sterno-clavicular articulation		1	0
Palate	6	2		Clavicle		1	11
Soft palate	4	0		Fingers		65	26
Pharynx	15	46		Thigh		7	7
Mouth	0	1		Hands		4	14
Chin	62	20		Arm		9	5
Eyelid	26	7		Elbow		1	0
Cheek	22	10		Malleolus		0	1
Nose	16	6		Calf		0	1
Ears	5	2		Popliteal space		0	3
Temples	1	1		Great trochanter		1	0
Face	1	1		Back		1	0
Forehead	3	3		Total		989	1165
Scalp	1	1					

Chancre of the mouth is more frequent than is generally believed. In many cases in which a chancre passes unperceived it has, no doubt, been located in the oral cavity. Chancre of the lips is the most frequent of the extra-genital chancre. It may affect a benign form with a barely appreciable superficial erosion in the shape of a fissure erosion in the middle furrow of the lower lip and of a flattened ulceration upon the lateral portion of the mouth. Chancre of the tongue is either located near the point, on the edges, or on the dorsum. It is met with 66 times in men, as against 44 times in women. Chancre of the gums is rather rare, only 17 cases being reported in 2154. Nobl, Rosenthal, and Grimm have each reported a case due to dental instruments.

Chancres of the palate and soft palate are most frequently located on the right side, and are raised, smooth, and red. They are usually transmitted by means of a pipe, as in the two cases reported by Ohmann-Dumesnil, in which the lesions were multiple, or through the introduction of saliva, or the contact of the nipple or of the penis in unnatural intercourse. Only 12 cases are reported among 2154 extra-genital chancres.

Chancre of the tonsils is met with in glass-blowers, nursing

infants, nurses, and *débauchés* of both sexes, and is caused by the saliva, milk, and by antiphysiological sexual relations. The right tonsil is more frequently affected than the left. Chancre of the nose corresponds to 3.7 per cent. of the extra-genital chancres. (a) When it appears on the dorsal surface of the nose it is readily limited and takes a benign form. This is not the case, however, when it affects the tip of the nose (Jullien's case) or the lateral portions, in which case the lesion is always very large, as well as the nose; partial destruction of the organ may be the result. (b) The chancre may appear on the mucous membrane. (c) The contagion may also affect the septum, by transmission of the virus by the fingers or by snuff.

Chancres of the eyelids generally occupy the cutaneous surface or the free edge or sometimes the lower *cul-de-sac*. They develop as vegetating, elevated papules or as ulcerations, and persist long after cicatrization (six weeks to three months). Chancres of the conjunctiva are very rare. They are most often located upon the palpebral conjunctiva, on the large angle or the smaller angle of the eye, or on the conjunctiva itself. They are prominent, with an indurated base. Among the 94 cases of chancre of the eye, Dubeek only found 6 located upon the ocular conjunctiva. This localization is, therefore, rather rare. Chancre of the cornea is extremely rare. Binet, in his thesis, reports a case in a medical student which manifested itself in the form of a small ulceration with a grayish "*fond*," which reached the size of a ten-cent piece.

Chancres of the ear are very rare; 14 or 15 cases at the most are cited. This is probably due to the fact that they pass unperceived. They are very slightly characteristic, and are usually only recognized by syphilographers or aurists. Chancre of the Eustachian tube offers a considerable field in the supra-palatine region around the orifice of the tube. It is developed after catheterization of the Eustachian tube, and the case of that most careless practitioner will be remembered who thus infected more than sixty persons.

Chancre of the face is not very common, though the causes of contagion (mouth and genital organs) are very frequent. First in frequency comes that of the chin, much less so that of the cheeks, and finally the nose and forehead. This chancre is the most common of all forms in children, which is explained by the fact that children kiss and are kissed by every one. Chancres of the chin are quite common in men. They usually follow razor wound or unnatural sexual intercourse. In women they are mostly due to kissing. Among 2154 extra-genital chancres, 62 were in men and 20 in women. Chancre of the cheek may be due

to contagion by razors, bites, and kisses. Tennesson reported a double chancre of the cheek. Fournier reports a case in which a young married woman was infected on her wedding day by being kissed after the ceremony by a syphilitic person. The razor and soap-brush are, however, the main causes of infection; 22 cases are reported in men and 10 in women.

Chancres of the back of the neck and of the scalp are very rare; they are most often transmitted by unclean pillows. Chancres of the neck are not frequent; they generally follow kissing. Fournier recently reported a case, in a child 22 months old, due to the kisses of an infected English maid. Extra-genital chancres may occur on any portion of the body. They have been met with upon the back, the abdomen, the navel, the chest, in the region of the great trochanter, on the calf, the axilla, etc. Cephalic chancres are relatively rare. They have been noticed, however, upon the upper part of the forehead, the temples, and the region of the occiput.

Chancres of the fingers are quite frequent; they affect physicians, midwives, persons having been bitten, and *débauchés* of every age who practice digital masturbation. Among 47 cases of digital chancre observed by Fournier, 30 were physicians and midwives. Chancre of the breast does not often occur in men, and when seen has always followed sucking or biting in a moment of libertinage. In women, on the contrary, it is one of the most common extra-genital forms. Outside of nursing, the most frequent cause is infection by the buccal or nasal secretions of a syphilitic infant or by lesions of an adult person called upon to suck the breasts to induce depletion.

Chancres may affect any portion of the breast.

Chancres of the nipple	48
Chancres of the base of the nipple	24
Chancres of the periphery of the organ	48
Chancres, non-specified	328

According to Dimey, mammary chancres form a proportion of 13 per cent. of all extra-genital chancres and of 19 per cent. of the latter in women, amounting to 1 in 27 of all chancres. In the author's statistics mammary chancre, taken as a whole, gives 463 cases in a total of 2154 and, in women, 460 cases among 1165.

The opinion that extra-genital chancres should always give rise to fears of grave syphilis is due (1) to the fact that in the serious cases observed the initial accident passed unperceived or was incorrectly or too late diagnosed, (2) that it was not treated, (3) that, therefore, the general condition became rapidly aggravated, (4) that in certain regions there was a continuous irritation,

and (5) sometimes to the fact that the patient was attacked by a form of neurasthenia, or, being informed of the malignity of his disease, rapidly declined, offering no resistance to the spread of the disease.

[It is a fact that in many instances extra-genital chancres are followed by exceptionally severe forms of syphilis. I have observed this in a number of cases in medical men, who have certainly not done so well on the average as my non-medical syphilitics. I have attributed this to the well-known intractability of physicians when asked to play the rôle of patients. The above considerations did not apply in their cases. The prevalence of the opinion that "syphilis insontium" is usually of a grave type indicates the need for further observations on the subject.—J. W. W.]

Secondary Manifestations.

In speaking of the significance and prognosis of syphilitic adenopathy in the secondary period, Augagneur, of Paris, ¹⁴_{Feb. 20, '96} states that a large chancre may be accompanied by an adenitis of medium intensity, and in the same way a slight tumefaction only of the glands may accompany ulcerating syphilides in the secondary stage. On the other hand, generalized and extensive adenopathy may co-exist with insignificant manifestations in the skin or mucous membranes. This want of harmony arises from the fact that primary or secondary adenopathy is not so much a sign of the intensity of the infection as of the vigor with which the organism resists that infection. In the great majority of cases, syphilitic infection occurs, without effraction of the blood-vessels, through the connective tissues of the skin or mucous membranes and is propagated by the glands. If the latter perform their functions with energy the infectious agent is modified by phagocytosis, and does not enter into the general circulation until its toxic properties have been modified. The author has demonstrated that syphilis before puberty is generally benign, though primary adenopathies are enormous and tenacious. Phagocytosis therefore influences the virulence of the disease. In an old man chancre causes an insignificant adenopathy, but the disease is very grave and the secondary symptoms rebellious. The glandular system no longer acts as a barrier, and the evolution of the affection is the same as if inoculation had taken place through the blood. In the fœtus there is direct inoculation without the intervention of phagocytosis; hence hereditary syphilis is extremely grave. Vaccinal syphilis is also serious, but in cases of this kind the skin has always bled, and direct inoculation has taken place. Secondary

adenopathy thus renders the prognosis favorable. When intense and generalized, but naturally without localized inflammatory complications, it accompanies benign syphilis and indicates the powerful resistance of the organism. If these assertions are well founded, it must be admitted that there is reason for favoring phagocytosis by leucocytic medicaments, such as salicylic acid.

The state of the spleen in acquired syphilis has been studied by Colombini⁵⁰⁷_{V.30, No.1} in eighty cases. The author finds that tumefaction of this organ must be regarded as one of the first accidents of the secondary period and coincident with adenopathy. The presence of these two symptoms enables a diagnosis to be made before the appearance of cutaneous or mucous syphilides. Hypertrophy of the spleen is of importance as regards prognosis and treatment, and the latter should not be discontinued until the organ has regained its normal size. It usually remains enlarged during the first year, and slowly diminishes in size. The tertiary period is not accompanied by hypertrophy of the spleen.

A. Bayet,⁴⁷⁹_{V.6,p.705}⁸¹⁴_{Oct.1,'95} in an article on the durable stigmata of secondary syphilis, remarks that the traces left by tertiary syphilis are so well marked that they are readily detected. Oftentimes, however, it becomes difficult to decide whether certain marks which may be present are due to secondary syphilis, the question being an important one. The first sign of which Bayet speaks is the syphilitic chancre cicatrix, which is much more frequently found in men than in women, and which varies in appearance with the part attacked. It may disappear in time. According to the author, its value is far from being absolute. It is of greatest value when its characteristics are well marked,—*i.e.*, when there is a whitish cicatrix with a zone of hyperpigmentation, and which attenuates with the age of the disease.

The second sign is that of syphilitic leucoderma, which appears during the secondary period and persists often for a long time. This sign is more frequently found in women than in men. It occupies the posterior and lateral regions of the neck. It appears during the first six months of the infection and persists for years.

The third sign is the achroma, which persists in the regions where condylomata have existed. This latter, however, presupposes a symptom which is far from being a constant one.

Jonathan Hutchinson⁸⁰⁶_{July,'95} calls attention to the fact that it is a great mistake to suppose that the eruptions which occur in secondary syphilis can always be recognized by their own special characters. That the outbreak is general and symmetrically arranged, that it does not exactly resemble any one of the recog-

nized non-specific eruptions, but mixes the characters of several, are, perhaps, some of the best general indications for diagnosis. Among the more special ones may be mentioned the following: 1. Syphilitic eruptions are seldom attended by congestion of a bright tint, but are usually more or less dusky. 2. In addition to the dusky hue, due to congestion of venous capillaries, there is often a color which is recognized by the terms "coppery" or "lean-of-ham" tint. 3. Syphilitic eruptions show a preference for certain positions,—the abdomen and front of chest, the bend of the elbow and front of forearm, and the face. 4. Syphilitic eruptions are often polymorphous,—*i.e.*, scaly, papular, lichenoid, and pustular, all at the same time.

[The absence of subjective sensations—itching, burning, etc.—should not be omitted from this list. It is quite as valuable a differential point when the diagnosis rests between syphilis and any form of dermatitis as most of those mentioned. The absence of scratch-marks, for example, in a patient with a wide-spread papulo-squamous eruption, is, to my mind, always a valuable help in arriving at a conclusion if the case is doubtful. Of course, the therapeutic test will usually be conclusive; but generalization, symmetry, regularity of evolution, polymorphism, rounded outlines, dullness of hue, and absence of pain and itching will usually make the diagnosis certain in advance of treatment.—J. W. W.]

At the Medico-Chirurgical Society of Edinburgh Cathcart³⁶_{Mar., '96} showed two patients illustrating ulcerative forms of secondary syphilis, and remarked that, although Jonathan Hutchinson had showed that rupia was not generally a tertiary symptom, the old view was not overthrown, and it might be important medico-legally to ascertain at what periods ulcerative processes might occur. The first case was that of a lad who acquired syphilis in July, and came with a well-developed sore on September 6th, and, although ordered to take mercury, appeared again on November 1st with the most typical rupial eruption. He had been given mercury, the crusts poulticed off, and red lotion applied. The sores were healing, although the legs still presented deep ulceration. The hard sore had left no scar. Cathcart was of opinion that in most cases the ordinary hard sore did not leave a scar, although the soft sore did. The second case was that of a young man whose history was not so definite, as he had been exposed to contagion on several occasions. The throat was deeply ulcerated, although the disease seemed only of about three months' standing. In the first case absence of history of alcoholism or any indication of specially weak constitution confirmed Hutchinson's view that there was predisposition toward syphilis in

some cases. Many bad cases, however, were associated with alcoholism.

A patient presented by Fournier, ⁸⁶⁵ ⁸¹⁴ at a meeting of the Society of Dermatology and Syphilography, was affected with a secondary syphilis of recent origin and in the active state. He complained of an enormous appetite, which Fournier states is a rather rare feature of the disease in men. There was also a marked narrowing of the left visual field and a complete hemianæsthesia on the same side. Fournier considers it probable that the symptoms, which are common ones in hysteria, were due, in this case, to the recent occurrence of syphilis.

Tertiary Manifestations.

Charles Mauriac, ¹⁴ _{Mar. 13, '96} states that of 100 cases of syphilis not more than 20, and certainly not less than 5, develop bad tertiary symptoms. The maximum frequency of tertiary accidents is toward the third or fourth year. It is an indisputable fact, however, that their frequency has greatly diminished within the past ten or fifteen years. One of the reasons of this diminution is that the disease is better known and its various manifestations recognized and better treated. Hygienic improvements also play some rôle in the matter.

Once tertiary symptoms appear, recurrence is the rule. They may be perpetuated indefinitely either in the same regions or in others. A certain number of cases, however, either spontaneously or under the influence of specific medication, return to secondary manifestations.

Mauriac believes that it is unwise to create out of such heterogeneous material a sort of artificial syphilis under the title of "parasyphilitic." Soon all the diseases of the kidneys, the lungs, the heart, all the dyscrasias, and he knows not what else will serve to construct this parasyphilitic monument.

The dental anomalies of syphilis have been studied by Welander, ³⁷¹ _{V. 27, No. 8, '96} who questions whether Hutchinson's teeth may not be met with in patients who acquired the disease soon after birth,—that is, at a period when it is capable of influencing the process of dentition. Fournier admits the possibility of this, though no clinical observation has as yet been brought forward to support it. Welander, however, relates a conclusive case of this kind seen by him in hospital at Stockholm. The patient was a boy, 13 years old, whose parents were free from any syphilitic taint, but who, between the age of 3 and 4 months, was infected by his syphilitic nurse. When seen by Welander he was suffering from interstitial keratitis and periostitis of the left tibia.

The upper middle incisors presented a semilunar excavation on their edges, were small and short, but their crowns were not altered. The upper lateral incisors showed no erosion, but were small and badly inserted. Along the free edge and on the crown of the four lower incisors multiple characteristic erosions were to be seen. The other teeth were normal. There were thus changes only in those teeth in which ossification commences at the age of 5 to 7 months,—the period in which the little patient was in the full syphilitic diathesis.

Neisser, of Breslau, ⁶⁹⁷_{Dec., '96} expressed views which are summarized as follows: 1. Tertiary manifestations of syphilis, just like the papular lesions of the early period, are produced by an organized virus (syphilis bacteria); but the virulence of these bacteria is so modified—at least in the later years of the disease—that they are not infective for healthy individuals, and they are only capable of acting and of causing new formations in an organism already saturated with them. [See remarks on page F-6.—J. W. W.] 2. The following points must be borne in mind considering the etiology of the tertiary symptoms. (a) The special causes of any given tertiary process,—*i.e.*, the causes of its localization; such are (1) remains of the virus in the seat of the primary or preceding secondary lesions and (2) accidental provocation of the virus from trauma or pathological processes. (b) The general causes which favor the persistence of the virus in the body,—*e.g.*, alcohol, marasmus, malaria, etc., which diminish the power of resistance of the organism, but especially the insufficient or too late administration of mercury. 3. The real and most potent etiological factor in the production of tertiary symptoms is the lack of proper mercurial treatment in the early period.

In a paper on tertiary syphilis read at a meeting of the Vienna Medical College Neumann ⁶⁵⁰_{Nov. 21, '96}; ⁶_{Dec. 7} said that cell-infiltrations dating from the early stage, when mechanically or chemically irritated, give rise to proliferation and consequent tertiary symptoms in the skin, the mucous membranes, the bones, and internal organs.

[I have always been much struck with the very distinct relation between minor traumatisms and other forms of local irritation and the development of tertiary phenomena. The seats of predilection of the periosteal nodes, for example, are almost identical with those portions of the skeleton that are subcutaneous,—the skin, the cranium, the clavicle, the sternum, etc.,—and I believe that, if it were possible to get at the facts, it would be found that the localization of tertiary lesions in the viscera was determined by precedent conditions of congestion or of irritation. Neumann's view is certainly more in accord with the clinical facts

than that which invokes an active microbic infection to explain them.—J. W. W.]

He referred also to the influence of the idiosyncrasy of the patient, the general state of his health, and the existence of concurrent diseases, such as phthisis, malaria, and diabetes. Among intelligent communities, with the exception of large towns, there is but a trifling amount of tertiary forms; whereas, in countries where ignorance and superstition prevail, syphilis shows a malignancy resembling that displayed at the time of its first outbreak.

The differential diagnosis of lingual ulcerations in the tertiary stage is at times very difficult. Fournier,²¹⁴⁶₉₄ in his magnificent atlas of skin diseases, shows four specimens reproduced from those in the St. Louis Hospital Museum, which give an excellent idea of the four main types. The annexed colored plates are reproductions of the specimens shown. Fig. 1 in the first plate represents the cortical, or superficial, form of sclerous glossitis; Fig. 2 shows the parenchymatous, or deep, form. The second plate gives marked types of lingual gummata, Fig. 1 showing the superficial, or mucous, form, and Fig. 2 the deep, submucous, or muscular form.

Alex. Renault, of Paris,¹⁵²_{Oct. 26, '94} agrees with Fournier that the forms of late syphilis, to which authors have given various names, on account of the variety of their objective symptoms, such as "papulo-tuberculous syphilide," "syphilitic lupus," etc., should be classed together under the heading of cutaneous gummata. All show the structure and evolution of the gumma, being formed of nodules of embryonic cells and ending in resolution or in ulcer.

Fournier,³_{Nov. 20, '95} states that gummata of the vagina are very rare, but that they do occur, as in a case seen by him in a woman presenting serpiginous syphilides of the abdomen. This gumma was four centimetres from the urinary meatus, was ulcerated, with ragged edges and a cavity that would contain a large nut. This loss of substance showed that it had all the characteristics of gumma. It was accompanied by sharp pain in the lower part of the abdomen and painful micturition,—a point to which the author called special attention. In the discussion Verchère also showed a cast of a case of ulcerating gumma of the vagina from a patient 22 years of age. The loss of vaginal substance was rounded, with irregular base and circumscribed edges, but the latter were in no way detached or indurated. The diagnosis of gumma appeared clear, but inoculation in the abdominal wall was entirely negative and demonstrated that it was not a soft chancre. He treated the case by mercurial frictions and iodide of potassium in doses of 6 grammes ($1\frac{1}{2}$ drachms) daily, with a local dressing

Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4.





of iodoform powder and vaginal tampon. This treatment also demonstrated the nature of the ulceration, which became transformed in several days and healed rapidly. Barthélemy stated that he had observed several cases of vaginal gumma,—one in the recto-vaginal wall and another, a case of late hereditary syphilis in the upper part of the vagina, involving the clitoris and vestibule.

Montgomery, of San Francisco,²⁰⁰¹₉₄ calls attention to the liability of mistaking the enlargement of the subcutaneous lymphatic glands observed in the tertiary period of syphilis for leukæmia or lymphadenoma or tuberculosis. He reports several illustrative cases in which subsidence of the enlargement followed discriminating and persistent use of antisiphilitic remedies. In some cases of secondary syphilis in scrofulous individuals the lymphatic glands become enormously enlarged, and may persist after the antecedent lesions have disappeared.

Rouanet,⁸²⁷_{Feb. 13, '95} from the observation of three new cases, feels warranted in concluding that diffuse syphilitic mastitis may occur in men in the secondary or tertiary period of syphilis, sometimes resisting specific treatment and being with difficulty cured.

General Systemic Manifestations.

Joseph Collins,²⁴⁵_{May, '95} speaking from the point of a neurologist, states that syphilis of the nervous system is not different from that of syphilis of any other part of the body, except as it is impressed by the histological peculiarities of the parts which are involved. It is characterized, from an anatomico-pathological point of view, by the formation of feeble tissue, which is made up, in a great part, of small, friable, round cells with relatively large nuclei and excessive vascularization. These cells, when conglomerated, form the gumma, the granulome, and the syphilome. When formed, it has no tendency to resolution, but, on the contrary, it has a special predilection to undergo softening, to break down, slough, and leave an ulceration or the remains of ulceration which is filled up with reparative products in the shape of vulgar tissue that has been produced to cover the ulceration. This new growth, or the consequences of repair following its break-down, is the *materies morbi* in syphilis of the nervous system. It attacks almost exclusively the membranes of the brain and cord, the blood-vessels of the nervous system, especially the veins and the peripheral nerves, and the symptoms resulting differ as do the parts involved.

The dictum that syphilis in its early stages attacks only the skin and mucous membranes has been shown to be absolutely without foundation in fact. It was believed until quite recently,

and is yet by many, that nervous affections of syphilis were limited to the tertiary stage of that disease, and that cases reported as occurring during the secondary manifestations were but evidence of a precocious tertiary stage. Any number of observations corroborated by pathological findings have been made to disprove such an assumption. In fact, it is not at all improbable that nearly as many cases of syphilis of the nervous system occur during the early stage as during the late, and, although no hard and fast line of demarkation can be made between the secondary and the tertiary stages, those cases in which the nervous system is involved before the end of the second year after infection may be considered as early manifestations of the disease.

George Ogilvie, of London, ^{June 1, '95} calls attention to the fact that a tendency still prevails to accept a previous history of syphilis as sufficient evidence of the specific nature of a nervous affection, however remote its onset may be from the time of the infection or from the time of the last undoubted manifestation of syphilis. Of two cases of an identical affection of the third nerve occurring at the same time of life—say, between 50 and 60 years: one in a patient with a history of syphilis dating back twenty years or more and the other in a patient without such a history—one case will be diagnosed as late syphilitic disease and the other as probably of senile origin. The difficulty is increased by the fact that syphilitic diseases of the nervous system do not differ in appearance from those due to other causes. Ferrier very appropriately objected to Erb's paraplegia being raised to the rank of a disease *sui generis*, as it is in symptoms identical with other cases of transverse myelitis. Ogilvie adds that Erb himself, in his original communication, speaks with the greatest reserve on this point. Should we learn to discriminate between syphilitic nervous diseases and non-syphilitic nervous diseases in syphilitic subjects, the frequency of "tertiary" affections of the nervous system will shrink considerably, and the fact will stand out clearer still that nervous disease is an early manifestation of syphilis.

Jonathan Hutchinson, ^{Mar. 20, '95} in the course of some remarks before the Royal Medical and Chirurgical Society, directed attention to the occurrence of a certain group of diseases of the nervous system at a comparatively early period of the disease, which occur by far most frequently during the period at which the disease is distinctly capable of communication and transmission, and invited the members present to express their views. The opinions expressed divided the attending members into two groups,—those who thought that the occurrence of these diseases during the secondary stage of syphilis has been known and acted upon

for a tangible fraction of a century, as contended by G. Ogilvie, and those, with Ferrier at their head, who seemed disposed to deny that such is the case, holding that these affections may occur at all periods of the disease without any marked predilection for this or that particular period. The last-named author thought that the tendency of the contemporaneous profession—using the term in its widest application—is in favor of regarding all nervous manifestations as the corollary of the late periods of syphilis; indeed, he has over and over again heard it advanced, as against the diagnosis of a given case being syphilitic, that the nervous complication has occurred far too soon after infection to warrant its being classed as specific.

[There appears to be some reason for thinking that, while syphilis in general is becoming both milder and less frequent, the proportion of syphilitics who develop nervous phenomena is increasing. If this be true, it is probably due to the worry and excitement and nervous strain of modern life. The same factors would certainly tend, in accordance with the general principle of localization of syphilitic lesions (which are strongly influenced at any period by irritation of any form), to direct toward the nervous system the manifestations of secondary syphilis. It is quite possible, therefore, that both the older and the later views are correctly stated. Formerly nervous syphilis developed as a tertiary phenomenon when the disorders of advancing years offered the opportunity. Now other forms of irritation or of threatened degeneration predispose at an earlier period to the same localization of the disease in the nervous system. At any rate, the clinical fact is undeniable, and it does not do to assume that because a given nerve-lesion occurs within a year or two of the chancre that it cannot be syphilitic.—J. W. W.]

[In an editorial the *Medical Press and Circular* considers this view as certainly founded on error, for, whatever conclusion may be arrived at on the subject in general, there is an abundance of clinical evidence to prove that acute affections of the nervous system do occur with considerable frequency within the first year or two of the primary infection. It is impossible to exaggerate the importance of this conclusion, for upon a due appreciation of its importance and validity must depend in a large measure the accuracy of the prognosis and the success of the treatment.]

Gowers referred to the analogy of the diphtheritic organism and the poisons it excretes, and expressed himself as inclined to regard tabes and other tertiary lesions as caused by some chemical product of the syphilitic microbe left behind after it had disappeared from the blood.

Vidal and Besançon²_{Mar. 30, '95} experimented on the effect of injections of streptococci and produced myelitis in 6 per cent. of their cases. They obtained four instances of complete paraplegia, which in one case was ascending in type. There were diffuse degenerations of the cord and engorgement of the vessels; but the most careful search failed to show the microbes in the cord, though they were easily found in the blood. Hence the lesions were probably caused by a soluble poison formed elsewhere in the body. Many other organisms have been found capable of producing disseminated myelitis. The bacillus coli, under certain circumstances, is one of those offenders.

Putnam, of Boston,⁵_{V. 30, p. 254, '95} gives an elaborate review of what is known as to the mode in which infectious processes produce the nerve-lesions which follow them. He points out that the spinal sclerosis occur under such a variety of circumstances—as syphilis, heredity in Friedreich's disease, anæmia, and pellagra poisoning—as to suggest predisposing tendencies or a place of least resistance in the tissues which favors the actions of the special poison and renders the cord peculiarly vulnerable to many different foes. Yet, an infectious element cannot be altogether ignored. Thus, he gives a case of disseminated sclerosis following malaria. Among other diseases in which an infectious origin is suspected are chorea, herpes, amputation neuritis (which is said to be rare in aseptic operations), poliomyelitis, and Landry's disease. Oettinger and Marinesco,³_{V. 3, p. 85, '95} in discussing the latter disease, allow that the anatomical substratum is not always the same, but they show that it is often of infective origin. In their own case, indeed, they demonstrated a wide-spread streptococcal invasion; but it may occur in certain forms of intoxication, even alcoholic, just as much as from several kinds of micro-organisms.

L. Jullien, of Paris,³⁶⁰_{Apr., '95} relates the case of a girl, 20 years old, suffering from severe syphilis, in whom large, violaceous papules appeared, relatively discrete on the trunk, but confluent on the lower limbs, and numerous and important mucous accidents in the vulva, the mouth, tongue, and pharynx. Among other curious manifestations were large condylomata of the gums and tongue; later there were marked symptoms in the pharynx; and finally an iritis, incompletely cured at the time of report. The emaciation was extreme and malnutrition remarkable. The infection was one of rare severity and early malignancy, which the author explained by the alcoholic condition of the patient, who was a barmaid and obliged to tempt clients both by voice and example. The disease had been recognized two months before the entrance of the patient into hospital, but the chancre was not remarked.

For fifteen days before admission the girl had been attacked by intense pain in the left side of the chest, for which a physician applied blisters. The right side was entirely free. Immediately after admission an eruption appeared over the painful area, extending from the chest to the elbow, including the axilla, and resembling zona, and from which the author thinks it should not be distinguished, since late authors consider zona as a general infectious disease, of which the cutaneous lesion is but an exterior manifestation. The nerves act as intermediaries between the eruption and the infection, the agents of which doubtless become localized in certain branches and, by the irritation which they cause, give rise to the changes in the skin. In the author's case the exanthem was the result of neuropathy or neuritis,—an inflammation transmitted by continuity of tissue from a nerve-branch to the cutaneous elements through the medium of the brachial plexus, which has more than one anastomosis with the thoracic branches. In this case it seems to have been the second intercostal nerve, which, according to Testut, ²¹⁴⁴_{v.11, p.848} is peculiar, from the fact that its lateral perforating branch turns outward, penetrates the axilla, there anastomoses with the accessory internal cutaneous brachial, and finally disappears in the skin on the internal surface of the arm.

Evetzky ³¹_{Feb.27, '95} reports the case of a peasant, 19 years of age, who was suddenly affected with bilateral amaurosis, without any other cerebral symptom except cephalalgia, which had developed eight days before. Some two years previously the patient had had a similar attack, lasting three weeks. Extra-genital syphilitic infection had occurred six years previously. Treatment by mercury and iodides for ten days caused return of vision, but external superior hemianopsia persisted. The author believes that a gumma was situated in the sella turcica, causing partial destruction of the chiasm of the optic nerve.

O. Lasch, of Breslau, ⁴_{Oct.1, '94}; ²_{Oct.27} points out the incorrectness of identifying visceral with gummatous syphilis. He describes early syphilitic jaundice occurring at a time when the early skin-lesions are present, which is further distinguished from simple icterus by its sudden appearance without previous gastric symptoms and by the absence of other causes. It lasts three weeks to three months, mercurial treatment causing rapid improvement. The explanation of this early jaundice is difficult. It has been attributed to the pressure of enlarged glands in the portal fissure, to the presence of a similar process in the mucous membrane of the biliary passages as is seen in the skin, to a non-gummatous affection of the liver itself, to the action of syphilitic toxins, etc. The author records three cases occurring in patients aged 19, 26, and 26 years,

respectively. In two of these there was a marked maculo-papular syphilide present, and in the third a similar eruption had just disappeared. Lasch gives details of forty-six recorded cases of this disease. The significance of this early syphilitic icterus is thought to lie in its treatment by mercury; the author contends that a rational mercurial treatment could not produce such a jaundice.

Neumann, of Vienna, ⁸⁴_{No. 20, '95} has studied the subject of syphilis of the vagina, uterus, and appendages. Of the earlier exanthematous syphilides, none can be clearly diagnosed on the cervix or vagina above the vulva, except mucous papillary growths. Of primary syphilitic lesions only 55 were detected in 800 infected patients; in 51 the portio vaginalis and in 4 the vagina was attacked. Gummata are far more frequent; they are most usually seen in the introitus and lower third (anteriorly) of the vagina. A diffuse gummatous invasion of that canal has been observed. Recurrence locally is very frequent in these syphilitic lesions of the vagina. Syphilis of the tube and ovary is a rare and very indefinite complication. Only one definite case of syphilis of the body of the uterus seems to have been recorded. Metritis and endometritis often kill the fœtus in syphilitic parents, but Neumann does not feel sure that these complications are in themselves specific. They come on in many women otherwise out of health, and the debility caused by syphilis, not the infection itself, may produce the endometritis. On the other hand, syphilitic disease of the placenta is a well-known and very distinct disease. It is quite easy to understand how the fœtus dies when it has to depend on such a placenta for nourishment. Neumann thinks that it is not evident why the fœtus is often born dead or too weak to live many days, yet free from any sign of syphilis, the placenta being also healthy. Just as mysterious is the equally frequent birth of a healthy infant when the parents show marked tertiary symptoms. The evil may, in the first class of cases, lie in the fœtal blood, but this point is not yet beyond the limits of hypothesis.

Parasyphilitic Affections.

For some years Fournier ²¹⁴¹_{p. 375, '94} ¹⁰⁶_{Feb., '95} has grouped under the title "parasyphilitic affections" those troubles occurring in the course of syphilis which, while undoubtedly depending upon the syphilis for their origin, are still, in the strictest sense of the term, not of a specific nature. They occur by preference or solely in syphilitics, but they lack the pathological characteristics of true syphilitic processes and are not affected by specific treatment. Fournier now brings together all the affections which he considers to belong to this category, constantly insisting, however, that our knowledge

of them, depending, as it does, almost solely upon clinical observation, is still very incomplete. In this group he places: 1. For acquired syphilis, leucoderma syphiliticum, the acute hysteroneurasthenia of the secondary stage, numerous neurasthenic manifestations of the later stages, hysterosyphilis, tabes, general paralysis, a special form of epilepsy, and muscular atrophy. 2. For hereditary syphilis, numerous general or partial dystrophic affections; organic malformations, especially of the teeth; disturbances in the physical and intellectual development; imbecility, congenital cachexia, rachitis, hydrocephalus; certain forms of simple meningitis in childhood; perhaps isolated cases of true epilepsy; certainly the tabes and general paralysis of childhood.

For each of these affections Fournier gives abundant reasons for considering them to be of a parasyphilitic nature. The best recognized of these is decidedly locomotor ataxy, and the belief that general paralysis and other organic nervous diseases are often, at least indirectly, of syphilitic origin is steadily gaining ground.

With regard to syphilitic epilepsy, Fournier distinguishes two forms, the first of which is merely a symptom of one of the ordinary cerebral lesions, while the other breaks out in the prime of life, after a longer or shorter interval from the primary infection, continues through many years, is accompanied by no other symptom, and, in contradistinction from the first form, remains absolutely uninfluenced by specific treatment. In considering this affection, as, indeed, throughout the book, Fournier withholds all theoretical and hypothetical deductions and simply presents to the reader the results of his clinical observation.

In his conclusion Fournier points out that such a review of the secondary effects presents, in a far more striking light than any description of the immediate effects of syphilis could do, the baneful nature of the disease, and, since these secondary affections are practically beyond the reach of therapeutics, the prime importance of prophylaxis.

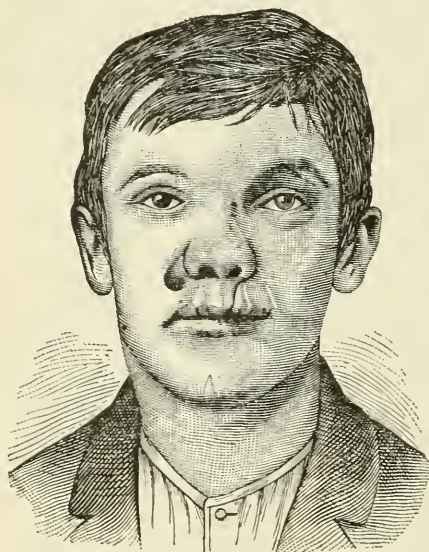
Hereditary Syphilis.

Diagnosis.—The diagnostic value of the alimentary curve in certain cases of hereditary syphilis is discussed by Pouzol, ²⁰⁰/₂₄ who states that children apparently healthy, but of syphilitic parents, sometimes show no other sign of the disease than a rapid and considerable loss of weight, the curve being characterized by a long and almost vertical line of rapid descent, the children losing from 350 to 400 grammes daily, with no digestive disturbances and sufficient milk. Mercurial treatment by Van Swieten's solution or frictions should be instituted in these cases and continued until the curve again distinctly ascends.

Krisowski ^{Oct. 14, '95} calls attention to linear cicatrices about the mouth resulting from ulcerative syphilitic processes as a manifestation which has received but slight attention. These cicatrices, which are well shown in the annexed cut, heal with difficulty, owing to the frequent motion of the parts. The author states that no other process can give rise to similar scars.

The seat of the lesion is in the cutis; whereas in eczema the epidermis is affected, and hence no scars are left. The scars about the mouth are not only characteristic of congenital syphilis, but also of its early appearance. They may be useful in distinguishing early from late congenital syphilis. Hereditary syphilis may also be thus distinguished from the acquired form. These scars are not so very rare.

[These scars are very commonly the result of intra-uterine syphilis. When superficial and fine they are probably due to ulcerating mucous patches which have undergone cicatrization. When deeper and more extensive they may have been preceded by actual gummata,—as the child is occasionally born with well-marked tertiary lesions. In any event, as the author states, they are valuable diagnostic signs.—J. W. W.]



LINEAR CICATRICES ABOUT THE MOUTH.
(KRISOWSKI.)

Berliner medicinische Wochenschrift.

Late Hereditary Syphilis.

—Commenting on a case of delayed inherited syphilis in a man 36 years of age, and cor-

roborated by Sir James Paget, T. Robinson, of London, ^{Nov. 9, '95} remarks that inherited syphilis has three epochs of activity: (1) where it manifests itself at or about birth, (2) where it manifests itself during childhood, and (3) where the disease is delayed until after puberty. Cases in adults are, he believes, not uncommon. If inherited syphilis will lie dormant for six years, why should not the period be prolonged to thirty-six, as in the case reported? We know that in the acquired form of the malady there is no limit to the time in which the organism may be attacked by the sequelæ. The sequelæ of scarlet fever, measles, and other blood diseases will spread over a number of years, and senile scrofula has be-

come current coin in the medical profession. The interest of all syphilitic problems lies in the attempt to follow backward the foot-marks of the poison.

[I have seen one such case which I believe would bear criticism, typical gummata developing in an adult (35 years of age). the circumstances being such that the possibility of any acquired infection might fairly and positively be set aside. Nothing procured healing of the gummatus ulcers, whose character was long unsuspected, except the administration of the mixed treatment.—J. W. W.]

A case of hereditary syphilis in a man of 26 years is recorded by Nobl, of Vienna, ³_{June 19, '95} in whom all the signs of hereditary syphilis were apparent,—*i.e.*, destruction of the nasal structure, ulceration of the nasal mucous membrane, opacities of the cornea, bilateral deafness, anæmia, etc. There was also intense albuminuria, possibly syphilitic. The diaphyses of the bones were greatly enlarged. The antecedent history of the patient left no doubt as to the diagnosis.

Gastou, of Paris, ³_{Nov. 20, '95} presented three patients before the French Dermatological Society,—mother, daughter, and granddaughter. The mother, without ever having had chancre or other syphilitic symptoms, presented, twenty-five years after the birth of her daughter, a tuberculo-squamous eruption, which was cured by mixed treatment. The daughter, born at term, developed, about the age of 9 years, numerous symptoms of late hereditary syphilis (nasal deformity, perforation of the vault of the palate and septum, Hutchinson teeth, etc.). She gave birth to a child with congenital amputation of the left forearm. At the time of report this child also presented frontal prominences and marginal exfoliating glossitis. The congenital amputation was an undoubted hereditary parasyphilitic deformity,—that is to say, without being syphilitic in nature, it was syphilitic in origin, since syphilis causes changes in the amnion, the placenta, and the fœtus, leading to deformities. In the discussion Fournier stated that he was convinced that alterations of the bones, teeth, etc., malformations, and other disturbances in children of syphilitic parents were not syphilitic in nature, but syphilitic in origin. They may be produced by other infections and should be classed among parasyphilitic lesions.

In a discussion before the Dermatological Society of Berlin Lewin ²²_{Jan. 23, '95} pointed out that many authors, Hænoch, for example, denied the existence of late hereditary syphilis, and illustrated by the following cases the misleading history sometimes obtained and the necessity of great care in the study of antecedents: A boy, aged about 9, suffered from a gummatus ulceration of the hard

palate. The father, who had syphilis, stated that the boy had been perfectly healthy up to three months before. By consultation with the family attendant, however, it was ascertained that the child had a specific exanthem a few weeks after birth. In another case a lupous syphilide appeared in a girl. Both parents denied having had syphilis. It was ascertained, however, that the mother had been infected by a foster-child, and had in turn infected her own. Neither case was, therefore, an instance of late syphilis.

On the other hand, Jonathan Hutchinson, of London, ¹⁰⁷⁷_{Feb. 18, '96} at his clinical museum, showed a case of simulation of osteitis deformans in congenital syphilis. The subject was a boy, aged 10, sent by Waren Tay. There were no facts in the family history in any way corroborating the suspicion of syphilis. The patient had displayed no infantile symptoms, nor did his physiognomy or teeth suggest anything. Notwithstanding this remarkable absence of corroborative facts, it seemed impossible to doubt a syphilitic taint. Both the boy's tibiae were very much enlarged in all dimensions, and through almost their entire length, giving to the legs the appearance of being bowed forward. The ulna in both arms was enlarged and thickened in a similar manner, and, as the radius had entirely escaped, the forearm presented a peculiar, bent contour. There was also great thickening of the right humerus and to a less extent of the left. The left femur a little above the knee-joint could also be felt to be thickened. The deformities produced were very remarkable, and exactly resembled those occurring in osteitis deformans in the adult. The thickening of bones had been first noticed about two years before, and were stated to have begun in the right leg. There was little or no tenderness about the bones, but there had been much aching. In the legs the fibula and in the forearms the radii had, so far as could be ascertained, entirely escaped.

Atypical Cases.—Genser ²²_{June 12, '96} observed a 3-month-old child with a syphilitic perforation through the hard palate. At birth syphilis was not suspected, but three weeks later discharges from the nose and characteristic rash on the face confirmed the origin. The author comments on the rarity of this defect in the palate from hereditary syphilis.

A rare, annular, congenital syphilide, in a child 15 months old, is reported by Carpenter. ⁵¹_{Apr., '96} Four or five months back his mother first noticed a few spots on the buttocks, also on the upper part of the right arm, for which she obtained some ointment. The spots on the arm quite went away, but those on the bottom became ringed, and the rings have continually enlarged up to the present time. The eruption was arranged as follows:

On the left buttock and adjoining thigh was an almost complete ring two inches in diameter. On the right buttock two rings coalesced in the shape of a bow, measuring one and three-fourths inches in its longest diameter and one and one-fourth inches in its shortest. At the back of the right thigh, adjoining the gluteal fold, an oval ring measured one and three-fourths inches by one and one-eighth inches. The eruption was raw-ham colored, while the surface inclosed was perfectly healthy and showed no trace of scarring. The rim was scaly, raised above the surface, transversely striated, and measured one-fourth of an inch in breadth. A careful microscopical examination was made of scrapings from the scales, but not a trace of fungus could be found. The margin was extremely characteristic, being broad, raised, scaly, copper-colored, and transversely striated. It was this, and especially the transverse striation, which made it, to his mind, so unmistakable. Indeed, in all these characteristics, with the exception of scaliness, it was very unlike *teinea circinata*.

André Moussous ¹¹⁸¹_{Nov. 15, '96} states that among the various unusual manifestations of hereditary syphilis observed by him one case of pemphigus of the plantar and palmar regions was of interest, coming on fifteen days after birth. Two cases, one of 4½ months and the other 6½ months, presented syphilitic gummata on the buttocks, thighs, and legs. The masses were hard and indolent, rapidly ulcerated in the centre, emptied, and broke down, leaving white, depressed cicatrices. The depression, at first marked, gradually diminished. He has also noted the frequent absence of eyebrows and eyelashes, one case of alopecia in an infant 22 months old, syphilitic orchitis coincident with double hydrocele and cured by antisiphilitic treatment, hypertrophy of the liver, and albuminuria.

Fournier ¹⁵²_{'96} presented at the Paris Academy of Medicine a report on two cases described by Régis, of Bordeaux, in which paresis was thought to have occurred as a result of hereditary syphilis. The patients were children, and the usually accepted etiology—alcoholism and moral considerations—could not be invoked, leaving but traumatism and hereditary syphilis as possible sources. The former could be excluded, leaving the last causative factor as the only one worthy of being considered in the case, supported, as it was, by marked subjective evidence. It is claimed by the author that, in a very large proportion of cases, adult paresis is due to syphilis. It may also appear in the child as the result of hereditary syphilis. Forty-two cases of this kind have been reported, 37 of them very completely; in 29 syphilis was indubitable, in 8 dubious.

A. Fournier and Gilles de la Tourette⁴⁵²_{Nov. 1, 2, '96} also relate two cases of congenital spasmodic tabes (Little's disease) in the etiology of which hereditary syphilis could be ascertained to have played some part. The fathers of both children were syphilitic; the mothers seemed to have remained immune. In both cases specific treatment seemed to produce notable improvement and a certain effect on the stiffness of the limbs. The authors therefore believe that antisyphilitic remedies should be given a trial in such cases.

[Perhaps the most interesting relation of hereditary syphilis to nervous troubles is in respect of epilepsy. Jackson and others have conclusively demonstrated a definite influence in that direction, and are strongly disposed to extend the field of observation and of the practical management of that disease along the same lines as locomotor ataxy, general paresis, and other nerve troubles now known to be frequently of specific origin. The advice, in every case of epilepsy without obvious local cause, to examine both the patient and all the members of the family for signs of syphilis is sound.—J. W. W.]

Charles E. Nammack¹_{June 8, '96} presented to the New York Academy of Medicine a case of skull deformity from inherited syphilis. On washing the child for the first time, about the fourth day after birth, the mother had noticed a swelling in the region of the anterior fontanelle, which remained and grew harder. At the time of the report the child presented the following objective evidences of inherited syphilis: Skull-exostosis; flattened, sunken nose; double otitis media; notched teeth, and sword-blade tibiae. The case differs from cases of rachitis in the following particulars: 1. The skull-bone is thickened by new growth, rather than expanded and thinned, as in rachitic craniotabes. 2. The shafts of the long bones are affected rather than the epiphyseal ends. 3. The crests of the tibiae are enlarged and broadened, instead of being thinner than normal, as is usual in rachitis. 4. There is no cachexia present. 5. Ordinary symptoms of rachitis, such as prominent abdomen, beaded ribs, pseudoparaplegia, and attacks of laryngismus stridulus, are absent. The diagnosis lies between cephalhæmatoma which has undergone ossification and hereditary syphilitic bony hypertrophy. In favor of hereditary syphilis the mother's previous history offers some points. Her first pregnancy terminated at term in the birth of a dead child. Hæmorrhage preceded the birth, forceps were applied, and the dead child extracted. Her second pregnancy resulted in abortion at the second month. The patient was the outcome of her third pregnancy. Another child has been born since and is apparently healthy.

Caubet^{48 36}_{Oct., '94; Feb., '96} gives the notes of a case in which a syphilitic

woman, with a healthy husband, gave birth at eight and a half months to a dead infant, and then at eight months to a macerated foetus. She then had an abortion at two months, and afterward had her uterus curetted, while she herself was treated with iodide of potassium. Her fourth pregnancy, which was complicated with hydramnios, went to the full term and an infant with various malformations was born spontaneously. The child had harelip, an imperforate urethra, talipes equino-varus on the right side, etc. The question arises whether the malformations, like the hydramnios, stood in relation to syphilis as effect and cause.

Haushalter, ¹¹⁷⁰_{Dec., '96} at the meeting of the Society of Medicine of Nancy in May, 1895, reported the case of a child of unknown parentage brought to the hospital in a comatose condition, the coma (accompanied by eye disturbances) being interrupted by convulsive crises and rapidly culminating in death. The autopsy showed, besides the lesions of broncho-pneumonia, which beyond a doubt were responsible for the fever, an osteitis of the bones of the right ear, thrombosis in the arteries of the circle of Willis, and finally osseous ulcerations upon the inner surface of the cranial bones about the size of a shilling; in the centre the skull-plate was thin and transparent in plaques, and had a perforated, worm-eaten aspect. Haushalter presented the arteries and cranium, the lesions of which were, in his estimation, caused by hereditary syphilis.

Hock ³_{Oct 24, '94} presented the case of a child born at term, the mother being a II-para who had contracted syphilis during her first pregnancy, and had been delivered in the eighth month of a child which soon died. This second infant showed from birth no other symptom except coryza. At the age of 8 weeks he was attacked by erythema, which soon disappeared under the influence of protiodide of mercury, but within three days an œdema of the penis developed. An examination of the urine showed albumin and other casts and, as well, red and white globules. Other symptoms of syphilis now appeared, but were controlled by iodide of potassium. The author states that this is the first recorded instance of nephritis occurring so soon after birth.

Syphilis and Marriage.

Jonathan Hutchinson ⁸⁰⁶_{Jan., '95} calls attention to chancre recurring in the site of old sores without fresh venereal inoculation. In regard to the after-marriage chancre, he states that they occur in cases in which there is no evidence of remaining syphilitic taint than the local sore on the genital organ, and sometimes exactly on the site of former chancres. They never cause enlarged glands,

nor are they followed by secondary symptoms, but occasionally prove infective to the wife. Hutchinson believes that in all cases in which young wives acquire syphilis from apparently healthy husbands sores of this kind have intervened.

The author thinks that the liberal sexual intercourse often following marriage, usually preceded by a long interval of abstinence, is prone to relight old chancres. He has seen so many under these circumstances that he hardly believes them to be mere coincidences. As a rule, a man is not likely to expose himself to the risk of contracting fresh disease just on the eve of his marriage.

In a paper on the evolution of the syphilitic poison in man, Henry Lee, of London, ^{May 11, '95} alludes to the question of the lapse of time that ought to intervene between a syphilitic infection and marriage. He states that he has always held that no period can be specified; if the disease has become ingrained in a patient's constitution and he has become, as often happens, proof against any further mercurial action, no length of time will render him perfectly safe. If, on the other hand, he has gone early through a proper course of mercury, he may, in his opinion, marry at any time. In a number of cases he has given his sanction to a patient marrying under these circumstances, and has not as yet had any reason to regret his opinion. In one case a rash appeared after marriage, which was undoubtedly syphilitic; this, however, disappeared with some additional treatment, and no harm happened.

[Nothing that I know of warrants this sort of teaching. Time is of more importance than treatment. It would hardly be an exaggeration to say that five years without treatment make it more improbable that a man will infect his wife or procreate syphilitic offspring than two years with treatment. Time and treatment should be conjoined, however, before consent to marriage is given,—four years should have elapsed after infection and two to two and one-half years of that time should have been spent under active treatment. I have never known of an instance in which, this rule having been observed, any trouble has resulted from marriage.—J. W. W.]

Treatment.

Justus, ⁵⁷ _{June 16, '95}; ² _{Sept 21, '95} in a study of the blood-changes in syphilis and the influence of mercurial ointment, compares his views with those of Semmola, who in 1889 formulated the following propositions: (1) constitutional progressive syphilis not treated with mercury causes a diminution of hæmoglobin and of red corpuscles; (2) if a syphilitic person in whom this diminution is observed is treated

with mercury, from the first day of treatment there is an increase of hæmoglobin and of red corpuscles; (3) if, however, the mercurial treatment is continued longer than necessary, so that the mercury loses its specific power, its toxic action will produce a diminution of hæmoglobin and red corpuscles; (4) if mercury is given to a healthy subject, there appears to be a rapid diminution of hæmoglobin and red corpuscles. Justus comes to the following conclusions: 1. In untreated syphilis the hæmoglobin is more or less diminished, and this diminution varies with the severity of the disease and its tendency to spontaneous recovery. 2. A sudden diminution of hæmoglobin follows inunction or injection of a large dose of mercury. (This is directly contradictory to Semmola's statement.) 3. The diminution caused by mercury varies according to the severity of the disease and to the condition of nutrition; with injections of mercury the fall of hæmoglobin can be repeated after several injections. 4. The cure of the syphilitic lesions begins when the fall of hæmoglobin ceases and is followed by a rise. 5. The sudden fall of hæmoglobin due to mercurial treatment is a specific peculiarity of the blood of syphilitic persons only, and does not take place in healthy individuals or in other diseases. 6. This specific reaction of the blood is established at the time when swelling of the gland occurs; it disappears at the time when the existing syphilitic lesions attain the height of their development. Justus concludes that a specific change occurs in the blood of syphilitic persons, and this points to a specific means of treatment applicable only to the blood of syphilitic individuals. This specific condition of the blood, established by the action of mercury, precedes the affection of other organs, and the disappearance of this specific reaction, or the involution of the specific blood-change, occurs before retrograde changes appear in other organs. If syphilis is not treated, the evolution of the fall of hæmoglobin and also the slow increase of the same afterward are seen; if the disease is treated, the fall of hæmoglobin is greater and more sudden and the rise is also quicker. The cure by mercury is in all cases not absolute, but only varies according to the duration of time. The application of the above statements to the diagnosis is as follows: In doubtful cases and in cases of late syphilis with a fresh train of symptoms, a diminution of hæmoglobin, after inunction or injection of mercury, is characteristic of syphilis.

As already stated, Neisser ⁶⁹⁷_{Dec., '96} considers that the most important etiological factor in the production of tertiary symptoms is the lack of proper mercurial treatment in the early period. Neumann, of Vienna, ⁶⁵⁰_{Nov. 21, '96} on the contrary, argues, after closely ob-

serving 1048 cases, that syphilis is to be treated symptomatically, and not preventively nor by Fournier's chronic intermittent method. In the primary stage local treatment is to be adopted, and extirpation may be resorted to in some cases. Preventive treatment may be applied in the form of inunction in cases of œdema of the prepuce and phimosis or when the affection is localized in the urethra. General treatment is to be commenced when the skin-eruption appears, and there are cases in which it should be carried out even in the absence of any symptoms, as when marriage is contemplated, or in pregnancy, or in the case of a man whose wife has often miscarried. According to his experience, tertiary symptoms are observed in only 10 per cent. of the cases of syphilis treated in this way.

Caspary, of Königsberg,⁶⁹⁷_{Dec., '95} expressed much the same view at the Fifth Congress of the German Dermatological Society. In his opinion, statistics have not shown definitely that Fournier's "chronic intermittent" method of treatment protects any better from tertiary symptoms than other methods, while persistent and energetic dosage with mercury is accompanied by unjustifiable risks. The author recommends symptomatic treatment in mild secondary forms; if some secondary manifestations or tertiary symptoms develop, he always endeavors to carry out a course of treatment after Fournier's method, provided there is no contra-indication for it.

Neisser, of Breslau,⁶⁹⁷_{Dec., '95} however, insists upon the following points: Mercurial treatment must be instituted early and, indeed, begun with the first manifestations, as soon as the diagnosis is certain; it must, in the first instance, be applied with great energy; it must be carried out for a long time, generally for more than three years, in alternating energetic and mild courses of treatment, separated by sufficient intervals.

The method of administration he considers of secondary importance. The selection of the method should depend upon (1) the special object of the course of treatment,—whether it is to be rapid or slow, of long or of short duration, and the case severe or mild; (2) the external conditions under which the treatment is carried out; (3) the special properties of each preparation of mercury employed, its capability of absorption, etc., and (4) individual idiosyncrasies of patients. Mercury alone is to be regarded as the sole remedy which attacks the syphilitic virus itself, in proof of which is its effect upon the capacity for begetting children. Preparations of iodine have only the power of influencing syphilitic products and almost exclusively those of the tertiary period. Bath and sweat "cures" are often useful in supporting

the action of mercury, but they have no direct antisymphilitic action. In spite of its theoretical propriety, serum treatment has been followed by no definite results. Appropriate mercurial treatment, intelligently conducted and suitable to the circumstances of the individual, is absolutely harmless.

Neisser deems it erroneous to consider the frequency or form of the earliest manifestations as the sole standard for the sort and number of mercurial treatments, because, in the first place, much mercury is given without sufficiently long pauses in frequently recurring relapses, and, in the second place, we know that the absence of early manifestations gives no information as to the prognosis of the later phases of the disease. Therefore the object should be to cure every patient of his chronic disease by a chronic course of treatment, exception being made for a few special cases.

Augagneur, ²¹⁵_{Mar., '96} in a report to the French Dermatological and Syphilographical Society, on the subject of hypodermatic injections of mercurials in the treatment of syphilis, stated that there are serious reasons for not admitting the subcutaneous-injection method excepting as a method for unusual cases; these are the severe accidents to which, in a strict sense, they can expose the patient. Among these are: a condition of malaise going into syncope at the moment the injection is made; persistent pains, showing themselves long after the injections; the formation, around the foreign body deposited in the tissues, of an inflammatory zone which is painful to shocks and on motion; muscular paralyses, frequent and long-continued abscesses, accidents of embolism when liquid paraffin is employed as a vehicle, depression, dyspnoea, stitches in the side, accessions of cough after the injection, and severe mercurial intoxication, which at times necessitates surgical extirpation of the focus of injection, and which in a number of instances seems to have even determined death. In his opinion there is only one well-established indication for the use of mercurial preparations by the hypodermatic method, and that is the failure of inunctions. When the latter seem not to act with sufficient rapidity in a case of gravity, we should resort to it. We may equally employ it at the onset in cases of cerebral syphilis when the indications for immediate intervention are pressing.

Augagneur's report provoked a passionate discussion. Thibierge had been able, at the St. Louis Hospital, in the service of Besnier, to recognize the real and very rapid efficacy of mercury introduced by this method, but it had seemed to him too painful to be adopted as a unique measure. Jullien argued that energetically the usual method of administering mercury by the digestive

tube is untrustworthy, because we never know what quantity of the mercury is absorbed, nor, indeed, if any is. It is a dangerous method, for the mercury irritates the digestive tube, and may occasion intestinal disturbances and hæmorrhages, increased development of micro-organisms which exist habitually and normally in the intestines, and consecutively ulcerations and necrosis. Mercury introduced by the intestine gains entrance at first to the portal vein and then to the liver, whose function it is to retain the greater part of metallic substances, and thus it prepares the alterations of this organ, at the same time that the liver attenuates the action of the mercury. All these inconveniences are avoided when we administer mercury by the hypodermatic method. The rapidity of the action of this remedy when we administer it in this way is superabundantly proved. When injections of calomel are made, we find mercury in the urine two hours after the injection. Therefore, when it is a question of an accident about which there is doubt, but for which operative intervention is required unless it be shown to be of syphilitic nature, we must at once resort to calomel injection. He thinks that we are able by this procedure, employed in the very onset, to obtain the extinction of syphilis and produce a veritable abortion of the disease. As to the accidents caused by the injections, they do not exist for him. Those which have been published are due to regrettable errors on the part of the physicians, who have not properly employed the method.

[The hypodermatic use of mercurials is gradually finding its proper place in the treatment of syphilis. I cannot believe that it will ever come to be the routine method. It is of undoubted value where other plans have failed, in emergencies, and in certain so-called malignant cases. It is a relief to find the literature of the subject diminishing, the extravagant claims of unvarnished or unbalanced advocates lessening in number, and the whole method assuming a well-recognized, but strictly limited, position in the therapeutics of syphilis.—J. W. W.]

Jullien²¹⁴³₉₅ employs the calomel in liquid vaselin, according to the following formula of Balzer: Calomel, 1 gramme ($15\frac{1}{2}$ grains); vaselin, 10 grammes ($2\frac{1}{2}$ drachms). For ten injections. The substances must be carefully purified and the recipient containing them rigorously aseptic. The syringes and cannula must be boiled; the skin scrubbed and washed with soap, then with corrosive sublimate, then with ether. The mixture is injected deeply into the muscles of the external iliac fossa, four or five centimetres from the crest, and the puncture closed with collodion. Under these conditions Jullien asserts that there is no danger of intoxica-

tion or even of salivation, if it be previously ascertained that the kidneys are in good condition and the gums healthy. There is also no danger of phlegmon, provided the injection be made at the home of the patient and the latter consents to remain relatively quiet for a day or two.

Feulard, of Paris, ⁹⁹⁶_{Dec. 10, '95} has used calomel injections in a certain number of cases in his private practice and has had excellent results in every case. He used 0.05 gramme ($\frac{7}{8}$ grain) of calomel in 1 cubic centimetre ($15\frac{1}{2}$ minims) of sterilized oil.

M. Hirschberg ⁸¹⁴_{May 15, '95} employed intra-muscular injections of calomel-oil in forty cases, and states that the results were satisfactory, often far beyond his expectations; in more than one-half of the cases (twenty-two) the patients did not need any other treatment. The others were further treated in the usual way with potassium iodide or the weak preparations of mercury internally. Only in one case so far has there been an apparent "relapse." This one "relapsed" patient had received only four injections, but roseola and all other outward signs had already disappeared, when he ceased to be under observation.

Walter L. Pyle, of Washington, ⁹_{Feb. 23, '95} discusses the value of intra-venous injections of mercuric chloride,—a method introduced by Baccelli, of Rome. ⁵¹⁵_{No. 19, '93} In his opinion the advantages so far overbalance the objections that, viewing the present status of treatment, it should be considered as the most successful. He does not, however, advocate it in cases easily amenable to ordinary treatment or in the early stages of syphilis, but considers it of especial value in obstinate cases resisting other treatment, or in advanced cases of organic syphilis, or when immediate relief is urgently called for by reason of pain, encroachment on a vital part, or rapid destruction of tissue. Investigation may prove it to be most valuable immediately after the diagnosis is made, eliminating or destroying the syphilitic virus before it has produced any decided effect on the general system, but at present there is no evidence to warrant this statement. As the method is virtually devoid of dangerous or untoward results, it should be given some trial in the beginning of the disease.

R. Hogner, of Boston, ⁹⁹_{June 27, '95} used Baccelli's method of intra-venous corrosive-sublimate injections in a case which proved rebellious to the usual antisyphilitic treatment, finding that, although the results were not rapidly obtained, a change for the better did finally occur. The method should be resorted to when others fail.

Bruni ⁹²¹_{May 11, '95} used intra-venous injections of corrosive sublimate in a case of cerebral syphilis in a man, 25 years of age, syphilitic

for four years and attacked with Jacksonian epilepsy. He had been treated without result by intra-muscular injections of gray oil and iodide of potassium internally. On the ninth day 0.003 gramme ($\frac{1}{2}$ minim) of sublimate solution was injected into the left median cephalic vein, and on the following day 0.006 gramme ($\frac{1}{11}$ minim). In all sixteen injections were given. The epileptic attacks ceased after the second injection and the head-pains disappeared. When seen some time later no attack had recurred.

E. Porcelli¹⁰⁹⁵_{Oct., '95} greatly praises Baccelli's method as being far superior to internal medication or injections. He has never observed any accidents after its employment. After ten or twelve injections into the arm the walls of the vessels appear to thicken and harden as if the lumen were about to become obliterated, and in such cases he recommends making the injections in some other region.

Abadie, of Paris,⁶⁹⁷_{June, '95} lauds intra-venous mercurial injections. He employs a 1-per-cent. solution of cyanide of mercury and a syringe made entirely of glass, which can be perfectly sterilized and which contains 1 gramme ($15\frac{1}{2}$ minims) of liquid (0.01 gramme— $\frac{1}{6}$ grain—of cyanide of mercury). The arm being bound about the middle with a handkerchief, the vessels of the forearm and elbow swell, when a vein is selected, and the part to be pricked is cleansed and sterilized. The needle of the syringe is passed through the flame and then introduced gently in an oblique direction from the epidermis into the cavity of the projecting vein, almost horizontally to the epidermis and following the axis of the vessel. As soon as the cavity of the vein is struck—and this is easily felt—the needle is arrested, the handkerchief removed, and the piston slowly pushed down. The syringe is then withdrawn, and a light antiseptic dressing, fixed with collodion, is applied. The patients appear to feel nothing and are able to go at once to their work. No redness, swelling, or pain is caused beyond that which results from a simple prick of the skin. Abadie has never had the slightest accident, though he has administered from 400 to 500 injections. He gives an injection every other day and continues it for three weeks; then stops all treatment for a fortnight, and recommences the series, if necessary.

Wickham gives a note of warning. Should any accident occur through want of attention to the smallest detail it would be a serious matter, bringing about death through the introduction of air into the veins, or by generalized infection, phlebitis, etc. He therefore proposes to limit these intra-venous injections, as well as all subcutaneous injections, to serious and obstinate cases, and thus gradually build up experience.

Blaschko ⁴_{Nov.5,'94}; ²_{Dec.29,'94} uses rather a stronger solution than Baccelli,—namely:—

R Sublimat.,	. . . . .	0.3 part.
Sodii chlor.,	. . . . .	0.6 part.
Aq. destil.,	. . . . .	100.0 parts.

The author's cases were mostly of early syphilis. A therapeutic effect was always obtained if the treatment were continued long enough. He has already observed four relapses. The advantages of the method are its painlessness (if the vein is entered), the small amount of mercury given, the exact dosage of the drug (all of which is utilized), and the absence of unpleasant results. It appears to be inferior to inunction and subcutaneous injection in its permanent effects. The treatment is suited to cases where it is desirable to avoid large quantities of mercury. Baccelli's method shows how small a quantity of mercury suffices to cause the disappearance of syphilitic manifestations.

Dinkler ⁴_{May 20,'96} claims that as a result of his own experiments he does not believe intra-venous injections of mercury will ever supplant the inunction or intra-muscular-injection methods formerly employed, for the reasons that the technique itself is difficult, that the danger of thrombosis is great, and, finally, that sequelæ are more likely to occur.

[We shall probably have to go through the same experience as to intra-venous mercurial injections that we are just concluding with regard to hypodermatic injections. It is to be hoped that the period will be briefer and the early accounts of the results obtained less incredible.—J. W. W.]

At the meeting of the Medical Society of Berlin Heller ⁴_{Nov.4,'96} read a paper on the influence of mercury upon the kidneys as presented by the different methods employed, based upon a systematic examination of the urine of the patients in the clinic of Lewin during a year. Fürbringer had stated that in the examination of 100 cases treated by mercury he had found albuminuria in 8, about the end of the acme of the roseola. In the sediment were numerous kidney-epithelium cells and red blood-corpuscles. While some held albuminuria to be a symptom of constitutional syphilis, Weylander noticed a considerable increase of cylinders to accompany increased exhibition of mercury.

From November, 1894, to July, 1895, Heller had examined the urine 5130 times in 201 syphilitic men, 79 syphilitic women, and 35 men suffering from venereal buboes. He had also conducted a control series of investigations amounting to 1535 examinations in 83 syphilitic men. The percentages of albuminuria in the different forms of treatment were as follows:—

With sublimate injection,	4 per cent.
With inunction treatment,	28 per cent.
Inunction and injection of sublimate,	17 per cent.

He had never seen salivation during sublimate treatment. Patients with bad pustulous syphilides, with cachectic aspect and tuberculous diseases recovered without albumin appearing in the urine. A man who had already suffered from nephritis bore the injection without drawback. In the women the urine was free from albumin in 85 per cent. In the cases treated by inunction albumin occurred in 24 per cent. and when by sublimate treatment in 3.7 per cent.

Lewin, in the discussion, recommended never using mercurial frictions and iodide of potassium simultaneously, as iodide of mercury might easily form in the organism, this salt irritating the kidney very much. He alluded to a case of "*néphrite foudroyante*" following the injection of salicylate of mercury.

Saalfeld, ²⁸_{B.20, H.2} presented a case of nephritis following the use of or aggravated by the inunction of mercury in a case of syphilis. When the patient was first seen her urine contained 8 per 1000 albumin. After taking five inunctions of 45 grains (2.93 grammes) each the albumin had increased to 60 per 1000 urine.

Vollert, of Greiz, ¹¹⁶_{Nov., '94} recommends a 1-per-cent. solution of mercury succinimide and cocaine muriate in distilled water. The amount of the drug contained in each injection is $\frac{1}{6}$ grain (0.01 gramme). He claims that this form of mercury is generally well borne, while with the addition of cocaine it prevents pain. Extended use has shown its superiority over other preparations of mercury when used hypodermatically.

Rille, ⁶_{May 25, '95} assistant to Neumann, has published his observations upon a new remedy, hæmolum hydrargyriodatum, containing 13 per cent. of mercury and 28 per cent. of iodine. Hæmol, its basis, is obtained by mixing neutralized blood of warm-blooded animals with water and zinc-powder. In his opinion, it should be preferred to all other mercurial preparations, for it produces but trifling salivation without mercurial stomatitis. A case of periostitis of the parietal bone and of the spinous processes of some dorsal vertebræ healed under its use within thirteen days and a case of perforation of the hard and soft palate was decidedly benefited. As it contains iron, it possesses also tonic properties, and may be regarded as a very valuable remedy against all cases of syphilis complicated with pallor or scrofula. The dose is 0.8 gramme ($12\frac{1}{2}$ grains) daily.

Jullien ¹¹²⁶_{Nov., '94} uses 25 grammes ($6\frac{1}{2}$ drachms) of calomel to 75 grammes ($2\frac{1}{2}$ ounces) of traumaticin, and with a camel's hair brush applies it to the portions of the body covered with der-

matoses, painting a large part of the back the first day, the chest two days later, the thighs two days afterward, then the buttocks, returning again to the trunk. Three applications a week are sufficient for an ordinary case of syphilis. It corresponds to treatment by pills, but does not interfere with the digestive functions and is less active than inunctions. The dermatoses disappear in three weeks. The traumaticin is so adherent that the patient may bathe regularly without interfering with the treatment. Cauchard²⁹⁶_{Sept. 24, '94} has seen secondary symptoms disappear in from twenty to thirty days after five or six such applications. The method is especially applicable to papular, pustular, and squamous syphilides.

Serum-therapy.—Paul Raymond,⁷³_{Apr. 13, '95}¹⁰⁹_{June} in a review of serum-therapy in syphilis, states that researches in this direction were made in 1891 at the Hôpital St. Louis, in the service of Fournier and under the direction of Henri Feulard. These investigators employed the blood-serum of healthy horses and dogs in doses of 0.02 gramme ($\frac{1}{3}$ minim) and later of 0.01 gramme ($\frac{1}{6}$ minim) daily. The only effects observed were that the organism at large was placed in a better condition, nutrition was increased, and syphilitic diseases yielded more readily to treatment.

[While the serum-therapy of syphilis is of the greatest scientific interest viewed as a branch of the investigation into the value of other kinds of serum taken from immune animals or artificially impregnated with various toxins, it must not be forgotten that the therapeutics of syphilis are to-day most satisfactory. By the judicious use of mercurials and careful attention to hygiene the average results obtained in syphilis will compare favorably with those secured in any other generalized disease presumably due to microbic infection. We can, therefore, well afford to go slowly in the adoption of hypodermatic methods, or intra-venous injections, or serum-therapy, and can expect to cure, without recourse to them, about 95 per cent. of all patients. Let us hope that among these methods the other 5 per cent. may find equally certain and satisfactory means of relief.—J. W. W.]

Quite recently Istomanoff reported to the Medical Society of the Caucasus the good effects obtained by him by the procedure of Tommasoli. Secondary manifestations completely disappeared after fifteen injections of from 2 to 6 cubic centimetres ($\frac{1}{2}$ to $1\frac{1}{2}$ fluidrachms) daily. At the recent International Congress held at Rome Tommasoli stated that a few of his patients whom he had regarded as cured had shown relapses. While in the cases above cited the results all seemed to be favorable, the reverse has been reported by others. Kollmann, who claims priority for the pro-

cedure, has employed the serum of the sheep, the calf, the dog, and the rabbit, and all the results were negative. An important fact in connection with this is that the patients were under observation for a year. He even noticed the development of new lesions during the administration of the injections, in some cases. Mazza, of Cagliari, made a number of comparative experiments after the method of Tommasoli. The results were invariably negative.

Raymond states that, while the number of experiments has been comparatively small, the results have been negative in too many instances to make the issue of the treatment anything else but problematical. It would seem that the normal serum of animals is insufficient and something more is needed than the serum of animals refractory to the disease. It is for this reason that latterly animals are injected with toxins in order that their blood-serum may act properly. C. Pellizzari, in view of these facts, injected syphilitics with the blood-serum derived from other syphilitics in doses of from $\frac{1}{2}$ to 1 cubic centimetre ($7\frac{1}{2}$ to $15\frac{1}{2}$ minims). The author appeared to be satisfied with his method, but, up to 1892, he had made no formal conclusions. In 1894 he reported the continued good condition of his patients. He claimed that this serum exercised an immunizing action on the tissues not yet attacked by the virulent agent. Bonaduce made a few researches of an analogous nature. He employed the serum of newborn syphilitic children affected with antenatal syphilis. He mixed 35 cubic centimetres ($9\frac{1}{2}$ fluidrachms) of this serum with 100 of water, and exposed this mixture to a temperature of 100° C. (212° F.) for ten minutes. He administered twelve injections to a patient, and seven months later he was well. Richet and Héricourt and Mazza have injected animals with the blood of syphilitics and used the serum thus derived from the animals on syphilitics with most excellent results.

Bernard E. Vaughan, ²⁴⁵_{Apr., '95} in a paper before the New York Academy of Medicine on experiments with animal blood-serum in the treatment of syphilis, stated that the idea of these experiments was suggested by the fact that animals seem to enjoy immunity against the poison of syphilis. The serum employed was obtained from the blood of a horse, which was extracted from the jugular vein. The experiments were commenced about one month ago, and up to the time of the report 20 patients had been treated. In only 2 of the cases were the injections followed by a rise of temperature. In 4 of the cases a slight urticaria appeared. There were no abscesses. The treatment seemed to produce a more rapid disappearance of the primary sore and the cutaneous lesions.

Four years ago Héricourt and Richet ¹⁴_{Jan. 10, '95} recommended injections of dogs' serum, in the wards of Fournier, against lupus and syphilis rebellious to ordinary medication. In two cases of syphilis not amenable to specific treatment dogs' serum quickly transformed the general condition and paved the way for an efficacious application of ordinary specific treatment.

Gilbert and Fournier ³_{Apr. 27, '95}; ²_{June, '95} inserted under the skin of certain animals the serum of the blood, chancres, and papules obtained from patients suffering from primary and secondary syphilis, with the object of increasing the natural antagonism of the blood of these animals to the syphilitic poison. While some of the cases in which the serum obtained from the animals thus treated had been injected showed marked improvement, others appeared to be uninfluenced by it. A patient may be instanced who presented, at the commencement of the treatment, three cicatrized preputial chancres, roseola confluens, and nocturnal headaches. In the space of twenty days he received 48 cubic centimetres ($12\frac{1}{2}$ fluidrachms) of serum in seven injections. The roseola paled, but nevertheless persisted; hence, although the man's other symptoms and general condition were favorably influenced, the authors are inclined to regard the result as negative. Further researches are in progress.

Cotterell ²²_{Aug. 28, '95} states that he has treated 18 cases of syphilis by injection of the serum of the blood of patients who had gone through an attack of syphilis and were rendered immune. The treatment was pursued over six months. In the early stages of syphilis—*i.e.*, when there was only a sore and glandular enlargement—injections of this serum caused the sore to heal rapidly. The adenitis in the groin generally became intensely marked; the skin and throat symptoms were either absent or only slightly marked. When the case was not seen until the rash and throat symptoms had developed, the skin eruption faded rapidly,—much more rapidly, as a rule, than under mercurial treatment,—but the throat symptoms disappeared rather slowly. The general health was improved. The serum from an individual with well-marked secondary syphilis appears to be more active than that obtained from a patient with tertiary symptoms. The author has not yet accurately determined the amount to be injected, but he has used the serum in doses of from $\frac{1}{2}$ to 5 cubic centimetres ($7\frac{3}{4}$ minims to $1\frac{1}{4}$ fluidrachms).

Guladze, of Warsaw, ⁵⁸⁶_{No. 30, '95} reports a case of severe syphilis cured by the ingestion of thyroid gland. The dose of 2 grammes (30 grains) was progressively increased each time by the same amount; so that, at the end of some time, the patient was taking

14 grammes ($3\frac{1}{2}$ drachms) at a dose. Every second day the treatment was interrupted for twenty-four hours.

E. R. Frank^{No. 37, '95} claims that formalin is as efficacious as carbolic acid in cases of soft chancre. It is true that applications of the remedy cause some pain for several seconds, but they have the advantage of destroying the virus with remarkable rapidity. Within twelve hours the chancre becomes dry, and, when the ulceration is not too deep, one application is sufficient, a bit of cotton fastened to a holder being dipped in formalin and applied.

Von Herff¹¹⁹⁰_{June, '95; Aug. 3} states that the disagreeable odor of iodoform causes women affected with soft sores often to neglect to apply it according to instructions. The best treatment therefore is immediate cauterization with phenol. The genitals must be well cleansed with sublimate first. The "sore" will then appear to be made up of numerous minute ulcers, but some separate ulcers are often to be found far off. Hence, the search for the full extent of the disease must be conducted in a good light. Then each ulcer is touched with a concentrated solution of phenol.

Szadek, of Kiew,⁶⁷³_{Feb., '95} expresses the opinion that iodine exerts an action not upon the syphilitic virus, but upon the syphilitic toxin products. He states that he has tried iodol in a number of cases with very good results, giving daily doses of 2 to 4 grammes (30 to 60 grains). The remedy was well borne.

Believing that the curative effects of mercurial preparations, in syphilis with erythematous eruptions, were due to the irritating action exercised at the site of the syphilitic lesion, in a manner similar to that of tuberculin over tuberculous lesions, A. Jarisch thought⁸⁴_{Nos. 17-23; July 1, '95} that other irritants might have the same effect. With that end in view, he employed Venice turpentine in fifty-two cases of syphilis, and with encouraging results. The treatment consisted in daily applications, over various portions of the body, of 5 grammes (75 grains) of the following ointment:—

R Venice turpentine,	.	.	.	.	.	.	.	3 parts.
Salicylic acid,	.	.	.	.	.	.	.	2 parts.
Lard,	.	.	.	.	.	.	.	15 parts.

After four or six weeks' treatment the syphilitic manifestations—such as erythematous eruptions, cutaneous papules, mucous patches, plantar psoriasis, and paronyxis—had completely disappeared in most cases.

Boeck²²_{July 31, '95} strongly recommends, against the buccal lesions of syphilis, the application of a 10-per-cent. solution of chromic acid, immediately followed by cauterization with nitrate of silver. It gives also excellent results in the treatment of soft chancre and in vegetations of the genital organs.

ORTHOPÆDIC SURGERY.

BY THE CENTRAL EDITORIAL STAFF.

SUBMITTED FOR COMMENTATION TO

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Rachitis.

Etiology.—In discussing the maternal causes of rachitis, A. E. Garrod and H. M. Fletcher, of London, ²_{Sept. 21, '96} express the view that, setting aside syphilis, the state of health of the father has little or no obvious effect in the causation of rachitis in his offspring. At any rate, they have never been able to satisfy themselves that such is the case. On the other hand, such authorities as Ritter von Ritterhain, Senator, ²⁰⁷⁶_{B. 13, H. 1, '79} and others consider that phthisis in the father is an important predisposing cause of rachitis in the child, but the experience of Garrod and Fletcher lead them to doubt the frequent association of the two affections.

As regards the occurrence of rachitis in newly-born children, its frequency has certainly been exaggerated, owing to the inclusion in this category of cases of other forms of bone disease, such as syphilitic affections and osteomalacia and cretinism. They quote Schwarz, ²⁰⁷⁷_{B. 8, '97} who stated that among 500 newborn children in Vienna 75.8 per cent. showed distinct signs of rachitis,—figures which are entirely at variance with their experience. If, in their opinion, congenital rachitis does occur, it is certainly extremely rare. On the other hand, there can be little doubt that there are most important causes at work prior to the birth of the child which may lead to the development of rachitis at an early period of life, and these form the first group of maternal influences,—the ante-partum causes. The ante-partum causes may be grouped as follows: 1. Ill health, malnutrition, or disease of the mother during pregnancy. One of the most important causes of malnutrition on the part of the mother is phthisis concurrent with pregnancy, and the authors have met with numerous examples of rachitis in children born under such circumstances. 2. Want of fresh air and exercise during pregnancy. Cases belonging to this group probably

occur more frequently in private than in hospital practice; they have seen examples in private practice. 3. Numerous and rapid pregnancies. No one will be disposed to question the liability of the youngest children of large families to rachitis, or that such liability is increased if the successive pregnancies have followed rapidly upon each other. 4. Multiple pregnancy. The authors cite a case illustrating the influence of twin pregnancies, and add that it may be supposed that just as during lactation the one twin may get more than its fair share of milk from its mother, so in their intra-uterine existence the nutrition of the more weakly one may suffer in comparison with that of the other. 5. Age of mother at birth of child. It is a recognized fact that a mother advanced in life, even though she has not had numerous previous confinements, is more apt to produce rachitic children than a younger woman. 6. Lactation during pregnancy. The authors believe this to be a very important and often overlooked factor in the causation of rachitis. 7. Heredity. The writers point out that any estimation of the influence of heredity in this connection is rendered extremely difficult by the fact that parent and child may alike suffer from rachitis, not because of any inherited tendency, but because both were exposed in infancy to similar unfavorable conditions of diet or hygiene. 8. Syphilis. Parrot has maintained that hereditary syphilis is the chief, if not the sole, cause of rachitis; but, in common with most of those who have written upon the subject, including such authorities as Henoch, the authors are convinced that such a view is untenable, although prepared to rank syphilis among the predisposing causes as a disease tending to impair the nutrition both of mother and child. Monti states that he has never seen a case of hereditary syphilis in which rachitis was not present. Baginsky found evidences of syphilis in 6 per cent. of all rachitic children.

The post-partum or lactation factors are classified as follows: 1. Deficient milk-supply. They have seen cases in which the occurrence of rachitis could only be ascribed to the difficulty experienced in obtaining the natural supply. In the case of twins the conditions are complicated by other causes also, and it appears to be especially the weakly twin that tends to develop the disease, partly because it obtains less nourishment and partly from inferior nutrition *in utero*. 2. Mother's health during lactation. The influence of the mother's health upon the constitution and quantity of the milk is well recognized; concurrent illness, overwork or worry, and confinement to the house are all active factors in this connection.

Menstruation appears to be no uncommon occurrence during

lactation; at any rate, among the lower orders. Tilbury Fox ²⁰⁸⁰_{V. 4, '68} considers this one of the most important of all the causes of rachitis, and gives as his experience that, with very few exceptions which can be otherwise explained, "wherever the rachitic child is entirely dependent upon the mother's milk, the mother will be found to have menstruated during lactation regularly for several months, and the degree of rachitis to be in direct ratio to the frequency, duration, and amount of the menstrual flow. If the child is partly fed upon food other than the nurse's milk, the disease is lessened in degree or altogether prevented," He quotes a series of thirty-nine cases to illustrate these points.

As regards the changes taking place in the milk during menstruation they quote Bouchut, Bequerel, and others, who found an excess of fat and a diminution of lime-salts, and especially of phosphates; but there has been considerable disagreement in this matter, and the most recent careful analyses of Schlichter ⁸_{Nos. 51, 52, '89; Nos. 4, 5, '90} show that the changes are very slight, and he looks upon them as insufficient to cause rachitis. They also quote Schlichter, who, unlike earlier observers, was unable to detect any marked change in the general condition of the child during the occurrence of the menstrual flow, although he carefully watched fifty-two infants under these circumstances, and who concluded that the occurrence of menstruation after the sixth week is neither prejudicial to the child or mother. Their clinical experience, however, tends to support the view that this has an important influence in the causation of rachitis.

Pregnancy during lactation is not a very uncommon factor in the causation of rachitis, especially among the lower orders, in which lactation is so often prolonged to an undue extent. Too prolonged lactation is well recognized as a cause of rachitis. Although the paper adduces many illustrative cases, the authors contend that where so many interacting influences are at work it is extremely difficult to bring forward scientific proof that any single one of them is responsible in any particular case. To sustain their point they quote a case in which a mother, affected with exophthalmic goitre, had borne seven children within twelve years, all of which were suckled for about sixteen months, and during her last pregnancy was suckling the previous child for some months. Here we have illness of the mother, rapid childbearing, overlactation, and pregnancy during lactation combined. The seventh child, aged 13 months, had beaded ribs, curved spine, enlargement of the epiphyses, and rachitic skull. The mother exhibited marked signs of Graves's disease, dating from twelve months previous to the birth of the child.

From personal observations in over 3000 poor children in St. Petersburg, examined as to rachitis, Joukowsky²⁰⁴³ finds that from the working classes of that city come the greatest number of cases of rachitis. Insufficient ventilation of their dwellings, want of fresh air, and the alcoholic habits of the parents are the principal causes not only of rachitis, but also of the great infant mortality. More than half the children of St. Petersburg die before the age of 10 years, according to this author; and he quotes Bistvow as stating that a practice of twenty-nine years in a village of Novgorod demonstrated to him that 60 per cent. of the children under 3 years suffered from rachitis. Bistvow also attributes the disease to insufficient ventilation of the huts, children born in the autumn being most predisposed. The physical weakness of the mothers and the excessive labor performed by them increase the gravity of the rachitis in the children.

An attempt is made by Irving M. Snow, of Buffalo,⁵¹ Jan., '96 to show that the disease among the Italians is due to the effect of the cold, damp, northern climate upon the offspring of a race that has lived for many hundred years in the warm, dry, sunny air of Naples and of Sicily. It is the physical deterioration of a southern race in a northern climate.

Samuel H. Friend, of Milwaukee,¹¹² Oct., '95 has had a case of cretinism under observation. Upon comparing the symptoms of this case with cases of rachitis, the evidence that it began as rickets appeared. He quotes Levrat,³²¹ Dec., '92 who observed ten children, from 11 to 15 years of age, having lateral curvature of varying degrees, accompanied by goitre, which, according to the parents' statements, had developed gradually with the lateral curvature. In four cases there were enlarged wrist-joints, like those seen in rachitic infants, and two cases had knock-knee. Friend had at the time of report two cases of rachitis under observation, receiving tabloids of the extract of sheep's thyroid. One had been under treatment for four weeks and the other three weeks. Both were doing remarkably well.

A case of congenital rachitis is described by R. Osgood Mason, of New York,⁵¹ Sept., '94 the child weighing six pounds and dying soon after birth. Both parents were healthy, and there was no family history of the disease. The author suggests, as a possible etiological factor in the case, anomalous nutrition of the bones during development, incident upon a mental shock received by the mother during the third month of pregnancy.

In a case of congenital rachitis reported by Townsend, of Boston,⁵¹ Oct., '94 the child's parents were young, well formed, and healthy, as were the other children in the family. There was no history

of syphilis. During the time the mother was pregnant the family suffered much from poverty. The extremities showed marked signs of rachitis by (1) enlargement of appendages, (2) curvature of the long bones, and (3) numerous fractures. Complete fractures of both tibiæ, of the left humerus, and of both bones of the forearm on the right side existed at birth. Both epiphyseal enlargements and curvatures were marked in degree. The child was fed artificially, but died on the ninth day. No autopsy could be obtained.

Pathology.—Clito Salvetti ⁷⁶¹_{B.16,p.29} made an histological examination of the bones in a case of so-called foetal rachitis, and found conditions differing so much from true rachitis that he is inclined to separate the two affections entirely. Although the macroscopical appearances were exactly the same, the zone of ossification of the cartilage, instead of being high up, was very narrow and but slightly vascular,—an important point, as in true rachitis it is exceedingly vascular.

Wachsmuth ³³⁶_{B.36,H.1} believes that the conditions for the precipitation of lime-salts in normal growing bone are the presence of fully-developed cartilage-cells and the presence of carbon dioxide in the tissue of the cartilage and bone in quantity not sufficient to hold the lime-salts in solution or to redissolve them when precipitated. In rachitis both of these conditions are incompletely fulfilled and in inverse proportion to the gravity of the disease, there being an abnormal development of the small-cell elements of the cartilage with scarcity of the fully-developed cells, while at the same time the free carbon dioxide of the blood is increased. In other words, rachitis is a chronic carbon-dioxide poisoning,—an asphyxia of growing bone.

The elimination of magnesium by the kidneys in rachitis has been studied by Oechsner de Coninck, ⁹²⁷_{June 1, '96} who found from 0.009 to 0.015 gramme ($\frac{1}{7}$ to $\frac{1}{4}$ grain) of this substance per litre (quart) of urine in several cases. He suggests that this oxide may, perhaps, partly replace the lime-salts in the bones of rachitic patients.

Puech ³⁴⁸_{Sept.14, '94; Oct.13} ¹₃₂₁³²¹_{Sept., Oct., '94} believes that rachitis is a contagious disease. Chaumier ³²¹_{Sept., Oct., '94} had often seen all or nearly all the children in the same family attacked with the disease. Asylums and places where a number of people live together usually contain a large number of rachitics. Baginsky, Henoch, and Chaumier have noted that in certain years the number of rachitics was larger. The observation of animals confirms the remarks made here in regard to human beings. During the course of the last year a true epidemic broke out among young pigs in a part of the department

of the Indre-et-Loire. The histological examination of the bones of two pigs that had survived the attack had shown the existence of the characteristic changes of the disease. From all this, asks Puech, is it right to conclude that rachitis is "infectious, parasitic, a specific disease, the microbe of which produces only rachitis, as the microbe of measles produces only measles?" In the meantime we must conclude, with Fédé, of Naples, that, since we do not know the pathogeny of rachitis, one may as well hold the microbial theory as any of the others.

Mircoli⁹⁹⁷_{No. 11, '95; Aug. 24} pleads for the microbic origin of rachitis, believing that the disease is caused by the effect of ordinary pyogenic organisms upon the osseous and nervous system. Clinically he finds support for this theory in the fact that rachitis develops independently of social condition; frequently begins with eczema, boils, or intestinal catarrh; occasionally occurs epidemically, and is accompanied by fever, polyarthritic and bone pains, hydrocephalus, marasmus, and paresis of the lower extremities. Pyogenic organisms have been found in the bones and central nervous system of rachitic children. Experimental injection of pyogens into the bones and epiphyseal cartilages of young rabbits produced common osteomyelitis, but in other cases an osteomyelitis without trace of suppuration, with hypertrophy of the ends of the bones, hypertrophy of cartilages analogous to that of rachitis, and marasmus.

According to Hagenbach-Burckhardt,⁵_{May 27, '95; July 6} chronic infective processes are frequently localized in the bones in early age. There is nothing in the clinical picture of rachitis against the view of its being an infective disease. Acute rachitis is known. The spleen is frequently enlarged. The objections to the view are that no micro-organism has been found, and that similar changes in bone may be produced experimentally in animals by withholding lime-salts. The author thinks that the disease set up in this way is not identical with rachitis, nor does he think that foetal rachitis has been shown to be identical with the ordinary disease. He looks upon defective feeding, vitiated atmospheres, and acute and chronic infective diseases as predisposing causes only.

H. Ashby¹⁵_{Dec., '94} criticises the view of Cheadle and Barlow, that the anæmic and hæmorrhagic conditions in scurvy rachitis are due to absence of fresh food, and, therefore, are to be regarded as true scurvy. Ashby holds that the hæmorrhagic condition is an exaggeration of the anæmia which is always present in severe or acute rachitis.

Diagnosis.—Hagenbach-Burckhardt⁷⁴⁸_{No. 1, '96} calls attention to the pain and tenderness in the thorax as early symptoms of rachitis,

which render great care necessary in lifting and handling them. To prevent the further development of deformities of the spine and lower extremities, children should be kept in a recumbent position out-of-doors as much as possible, and attempts at walking discouraged until the disease is under control.

The researches of Mayet¹¹⁸_{Nov., '95} on the cadavers of twelve children from 1 to 6 years of age, with evidences of rachitis in the ribs and extremities, demonstrate that when the costal lesions appear early, as before the second year, they are frequently more developed on one side than on the other. This unequal development causes a sort of slipping of the two halves of the sternum, where the bones are not yet firmly fixed by transverse conjugation; the less diseased side develops normally, and the bony ridges are lower down than those on the opposite side; and the horizontal line, which would have united by transverse conjugation two points primarily side by side, now becomes an oblique line.

W. R. Townsend, of New York, ¹_{May 18, '95} observed a little boy with a rachitic deformity of the chest, consisting in a very marked depression of the lower portion of the sternum exactly in the median line. There had been apparently little or no interference with the breathing capacity.

Treatment.—W. Veit, of Berlin, ²²⁶_{B.59, H.1} has observed a number of cases in which spontaneous recovery of rachitic curvatures took place. Some of the cases, especially those presenting curvatures in the lower limbs, have shown a wonderful tendency to recovery, the “X-legs and O-legs,” as the Germans call them, straightening out in some cases almost perfectly as the child grew taller. Veit emphasizes the fact that the rate of improvement in the curvature of these limbs seems to depend largely upon the rate of rapidity of general growth.

Kampe, of Tübingen, ⁷⁶¹_{B.16, H.1}; ²_{Nov. 16, '95} concludes: 1. The greater number of all cases undergo spontaneous cure. Of the author's, —all severe,—75 per cent. were cured, 15.3 per cent. improved, and only 9.7 per cent. remained *in statu quo*. 2. The process of spontaneous straightening lasts usually two to four years. If the curvatures begin in the first or second year of life, the legs are quite straight by the fourth or fifth. 3. If the curvatures are unchanged by the sixth year, spontaneous cure does not take place at all. These are always cases of most severe general rachitis. 4. The chief aim in treatment is to improve the general health so as to strengthen the muscles. In Kampe's experience, as soon as the disease is past the acute stage, being about on the legs is not detrimental, but, on the contrary, helps the cure. Orthopædic treatment by plaster-of-Paris splints, etc., is not necessary. Oste-

otomy is indicated only when the curvatures persist after the sixth year.

[These statements are at variance with results as observed in the United States. Children with rachitis and curved legs grow worse if allowed to walk on their flexible bones. When the bones are soft they should be bent straight and kept so by plaster-of-Paris splints or other apparatus, and a mode of life and diet instituted that will check the progress of the rachitis.—R. H. S.]

Ketch⁵¹_{Oct., '94} urges the adoption of means to prevent the occurrence of rachitic deformities. One of the best means is the avoidance of injurious positions in the earliest stage of rachitis. During the "tender stage" recumbency, varied by changes in the position, is generally indicated. By the use of a portative frame the advantages of fresh air can be secured. As long as the bones remain soft, constitutional remedies must also be used. Each case should be studied from its own stand-point. The medicinal treatment should be varied from time to time, as changes in the constitution of the patient occur. Proper feeding, changes of air, and general hygiene are of prime importance. As a general proposition the use of apparatus in very young children should not be enforced, and it is especially in this class of cases that the use of manual force to correct the deformity is indicated.

The various manifestations, diagnosis, differential diagnosis, and prognosis of rachitis are reviewed by Benjamin Lee, of Philadelphia,¹⁹_{Feb. 23, '95} and by A. Jacobi, of New York.¹⁹_{Feb. 23, '95}

SPINE.

Pott's Disease.

Diagnosis.—Dillon Brown, of New York,⁵¹_{Oct., '94} gives the following points to aid in the diagnosis of Pott's disease in children: "The pain, general disability, and sickness are out of proportion to the apparent degree of spinal disease. The onset is alarming and the progress of the disease is more rapid than in tubercular caries, the paralysis being an early symptom and the deformity appearing even in a few weeks after the beginning of the symptoms. The local pain is intense; and the peripheral pains, the deformity, the extreme spinal disability and the paralysis, including incontinence of urine and fæces, rapidly grow worse in spite of rest in bed and instrumental support. Secondary disease soon appears, with rapid emaciation and marked cachexia, and the patient does not live more than six or eight months. Whether a vertebral caries is due to syphilis or to tuberculosis is of immense importance as regards prognosis and treatment. In both diseases

the symptoms are almost identical, and the diagnosis must be based upon the history, the presence or absence of the evidences of syphilis, and the result of treatment. In tuberculosis there is more likely to be an evening rise of temperature and the pus and *débris* may contain tubercle bacilli. Syphilis is suggested by nocturnal pains and the envelopment with chronic disease of some other joint or joints or some other part of the spine."

H. P. Woley, of Chicago, ⁷³⁹_{Oct., '95} has made a study of 84 cases, with a view to ascertaining the frequency and constancy of the more important symptoms. Family history was of but little value in the diagnosis, and the sexes were about equally affected. Rigidity was present in every case and kyphosis in 76 of the 84 cases. In 31 cases the deformity was in the dorsal region, in 21 in the dorso-lumbar region, in 19 in the lumbar, and in 5 cases in the cervical region, leaving 8 cases without deformity. Pain was present in 50 per cent. and most invariably felt at some point distant from the real seat of the disease. Abdominal pain was present in 20 per cent. of all the cases. Fifteen cases developed psoas abscesses (all in children under 10 years of age), 5 lumbar, —in adults giving a direct history of traumatism,—and 3 cervical. Psoas contraction, flexing the thigh upon the pelvis to a greater or less extent, was present in 20 per cent. of the cases. Only 3 cases developed paraplegia during the time they were under observation.

W. Beuthner ³³⁶_{Aug. 3, '95} reports 66 cases of spondylitis. This work, undertaken at the instigation of Schimmelbusch, gives a review of the methods of treatment and their results during the past four years in the cases of spondylitis seen at von Bergmann's clinic and polyclinic. This disease was located 4 times in the cervical region, 7 times at the junction with the thoracic region, 31 times in the thoracic, 15 times at the junction with the lumbar portion, once in the sacrum. In 6 of the cases there was no kyphosis; 38 patients had abscesses; 28 remained free from them. The good results obtained with the Lorenz plaster bed were particularly noticeable, and the latter is highly praised by the author. Among the supporting apparatuses were the plaster jacket, the use of which is almost unavoidable; the felt corset, used several times; and Taylor's spinal apparatus, which was used in a number of cases.

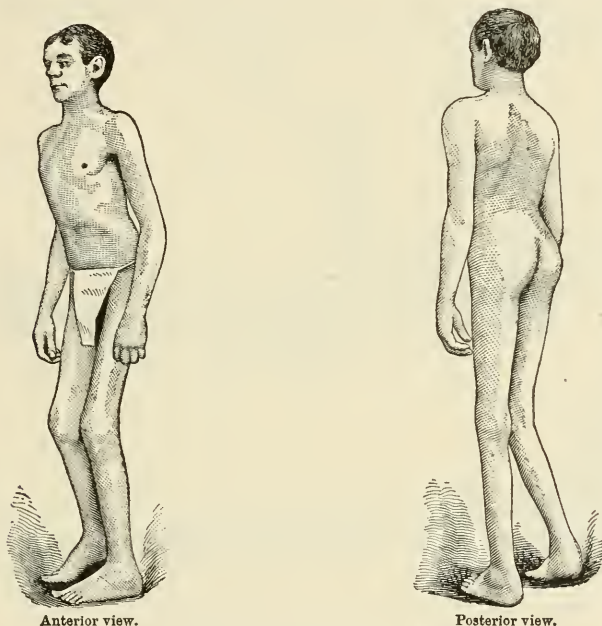
A report of four cases of spondylitis of the second cervical vertebra was read by Reginald H. Sayre before the American Orthopædic Association. ¹_{Nov. 9, '95} In all of these rather rare cases there had been noted a small swelling at the back of the neck, at the level of the first or second cervical vertebra, which in each instance

had happened to be on the right side of the neck. In each case the chin had been directed toward the right side of the body, the right sterno-cleido-mastoid muscle had been rigid, the face had looked downward, and the left ear had been brought much nearer the corresponding shoulder than its fellow. In one instance the face had been deflected so far from the vertical as to be almost parallel with the floor, and had pressed so closely against the clavicle as to cause an excoriation. The position of the head had been in marked contrast to that observed in patients with torticollis due to contraction of the right sterno-cleido-mastoid muscle. Motions of the head in any direction had been excessively painful, and the patients had supported their heads with their hands almost incessantly. In their turning to view any object the entire body had been moved as a solid mass without any rotation of the head. The jaw had been opened with great difficulty in all cases. All but one patient could, at the date of the author's paper, after treatment, open the mouth freely, and this patient had much more control of the mouth than formerly and was enabled to swallow with much more ease. In all the cases the chin had been so much depressed as to make swallowing difficult. The patients had been treated by means of a support, which had consisted of a pelvic belt with two upright back-bars passing upward over the shoulders and held in position by shoulder-straps and an apron. From this an extension-rod passed from between the shoulders to the base of the skull, where it joined a rolled-metal band passing around the head and secured in position by a forehead-strap and a strap passing under the jaw from ear to ear. Universal joints at the back of the neck and between the shoulder-blades allowed of the adjustment of this apparatus to any position of the head, while the distance between the head- and body- pieces was regulated by a ratchet and key extension. Three patients at the time of report seemed practically well, and since the removal of the support the range of motion of the neck had increased in all directions, and there had been no return of pain.

William E. Miles ⁶_{Nov. 3, '94} reports a case of ankylosis of the entire spinal column, the origin of which is not explained. The boy, at the age of 12 years, was treated for cervical caries, with plaster jacket and head-support for eighteen months, after which the spine is said to have been in the same condition of ankylosis as at time of reporting, when the patient was 21 years of age. After the removal of the jacket he was able to do hard labor without ill effect, and the spine remained in the same condition. Although the first symptoms of the disease may have been tubercular, there was nothing to suggest this in the way of spinal projection, abscess,

etc.; nor would local disease in the cervical region explain the general ankylosis of the spine. Syphilitic origin has no support, either by history or other indications of the disease, and the same is true of the rheumatic taint. There later developed an enlargement of the ankle, which with the ankylosis is rather evidence of a general cause which manifested itself in these two locations. The case is worthy of mention from the rarity of the condition at the early age of 21 years. (See illustrations.)

Treatment.—T. W. Sloan, of Seattle, Wash., ⁵⁹Aug. 10, '98 describes an apparatus by the use of which he is enabled to properly apply a



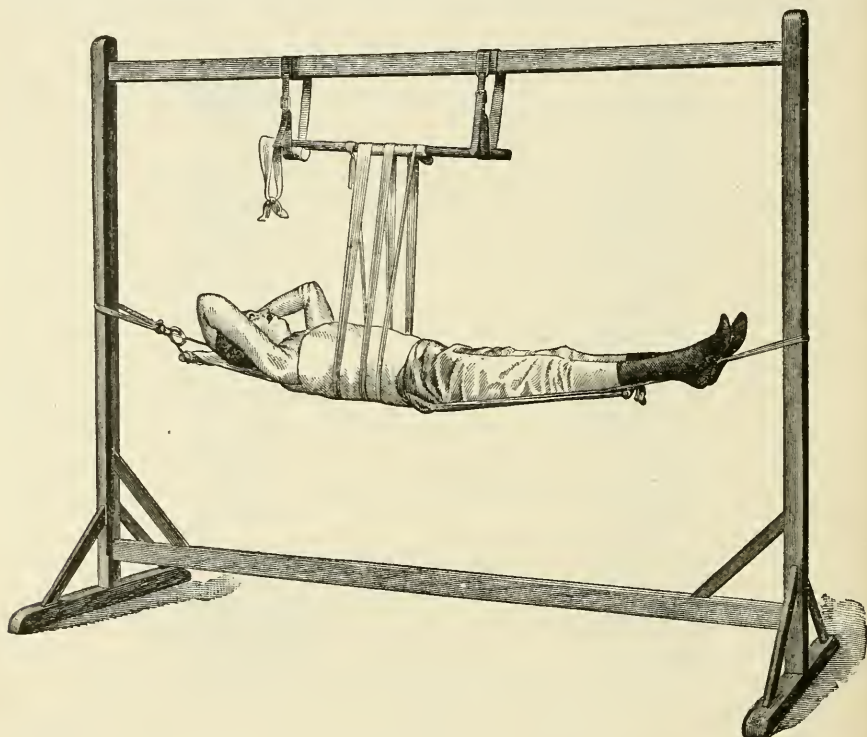
ANKYLOSIS OF THE SPINE. (MILES.)

Lancet.

plaster jacket while the patient is in the recumbent position. This apparatus consists of a frame 8 feet long and 6 feet high, to which the hammock is suspended, as shown on next page. The patient is divested of all clothing covering the trunk save a close-fitting knit shirt, and if the case is one of Pott's disease a pad of absorbent cotton is placed on either side of the processes of the diseased vertebra and held in position by one turn of a bandage around the body, after which the patient is placed upon the hammock. The end of a roller bandage is attached to the suspended bar, and about three turns of the bandage are taken around the body and up over the bar, leaving an interspace between each turn of the

bandage. The turns of the suspension bandage should be drawn sufficiently tight to cause the hammock to fit the concavity of the back, and after securing the bandage to the bar they can be further adjusted, if necessary, by raising or lowering the bar.

The plaster bandages are then carried from the trochanters to the axillary spaces, from four to ten five-yard ones being sufficient for an adult. It is also necessary to place a pad of folded towels or like material over the stomach and one over the chest, under the shirt, so that they can be easily removed after the cast becomes



HAMMOCK APPARATUS FOR THE APPLICATION OF THE PLASTER JACKET. (SLOAN.)
Medical Record.

set, thus allowing the patient plenty of breathing-room. When the cast has been applied the patient is left undisturbed for not less than two hours, and when the cast has become sufficiently firm the patient is placed upon the feet, and the two ends of the hammock, with the suspension strips, are cut off even with the cast. Lewis A. Sayre suggested that if the inventor could add traction by the head and feet, to overcome the reflex muscular rigidity while applying the plaster, he would make the apparatus perfect. Sloan, however, argued that muscular rigidity is overcome by this position

alone, and that strong extension is never required after muscular relaxation has been secured by a comfortable reclining posture. The steady, firm pressure exercised upon the muscles of the back while the patient is being suspended in the hammock will control muscular spasm with no less certainty than a well-applied bandage controls muscular spasm in a leg or an arm.

[Personal experience in applying plaster jackets in the horizontal position has led the editor to abandon it in favor of vertical suspension, except in very exceptional cases.—R. H. S.]

The influence of suspension on the circulation has been studied by Joachimsthal, of Berlin, ³²¹_{Oct., '94} who found that the frequency of the pulse was usually, but not always, increased by suspension. The exceptions were more frequent in the second group. The frequency of the pulse was diminished once in the first group and twice in the second. In four cardiac cases there was a change in the tracing indicating increased tension. There was no irregularity of the pulse after suspension. In a case of mitral stenosis, when the pulse was intermittent after climbing stairs, it became perfectly regular during suspension. The author concludes that suspension is not detrimental in cases with compensated cardiac lesions; others are to be carefully watched. In his experience, manual and mechanical corrective manipulations are never injurious in scoliotics with a cardiac lesion.

[The editor has reported cases of scoliosis in which a rapid and irregular heart became slower and more regular during suspension.—R. H. S.]

A quick method of removing plaster dressings is described by Gigli. ³²¹_{Feb., '95} At the time the bandage is applied he places under it a string covered by a strip of parchment-paper; the ends of this string are tied together outside. When the dressing is to be removed this string serves to draw a fine wire-saw beneath the plaster. This is directed with its cutting edge outward against the plaster, the ends are fastened in the handle of an ordinary chain-saw, and the plaster is quickly sawed through from within outward.

R. T. Taylor, of Baltimore, ⁷⁶⁴_{Feb., '95} quotes Bradford and Lovett as stating that in suspension in old caries of the spine it is only the physiological curves which are obliterated; the sharp kyphosis is held too firmly by inflammatory adhesions to permit of correction. In earlier cases with movable vertebræ the intra-vertebral pressure must be in a measure diminished at the point of disease by suspension, but suspension does not cause a disappearance of the sharp angular projections at the point of disease, and in cases that present themselves for treatment the deformity cannot be corrected in that way. These views are also held by Taylor, who has seen

clinically but little gained by suspension in so-called distraction of the healthy from the diseased vertebræ or in lessening the deformity in Pott's disease, the physiological curves being alone affected by it.

[Sayre never claimed to separate healthy from diseased vertebræ, and does not wish to tear apart ankylosed vertebræ.—L. A. S.]

Taylor has had made a plaster-jacket stool which apparatus aims, first, to put the patient in as comfortable a position as possible, in which, at the same time, he can keep reasonably still, and, secondly, to insure a position that will elevate the ribs and cause a backward bending of the spine, producing a certain degree of lordosis involving both the dorsal and lumbar regions. The object of this is that the centre of gravity of the body may be thrown farther backward and the superincumbent weight be removed more or less from the diseased body or bodies of the vertebræ to the healthy transverse and articular processes.

In an article on the mechanical treatment of Pott's disease of the spine, in the subacute or convalescent stage, J. C. Schapps, of Brooklyn, ¹_{Mar. 23, '95} states that physiological rest of the spine is possible only in the recumbent position, and during the acute or soft stage of Pott's disease this position, with adjusted pressure and, if necessary, traction, should be uninterruptedly maintained. But when for several months the deformity has shown no increase, the patient has eaten and slept well, enjoyed good general health, and, most important, the spine outside the diseased area has regained its flexibility, the convalescent stage may be considered as entered upon, and recumbency may be gradually and carefully exchanged for the upright position. This transition involves the bearing of weight, and that frequently at a mechanical disadvantage because of deformity. It involves, also, a constant subjection to adverse muscular action and external traumatism. It is, therefore, a period of great danger. The apparatus which Schapps employs is here presented. Posteriorly it is the Taylor brace (Fig. 1) with some unessential modifications, not his own, made with a view to simplifying it. Instead, however, of securing it to the trunk by a soft apron, which exerts a large amount of circumferential pressure and a minimum of posterior pull, he applies a rigid support in front (Fig. 2), the trunk being sandwiched between two braces, which are drawn directly toward each other.

A. M. Phelps, of New York, ¹_{Mar. 30, '95} proposes the aluminium corset as a substitute for the braces and corsets now worn in cases requiring permanent bracing, as in lateral curvature where the disease has been arrested. The aluminium corset presents the advantages of lightness and durability, while it is so thin as not to

interfere with the form and clothing. Being extensively perforated it is cool and agreeable as a support, and can be worn during bathing. In its preparation for a certain case a plaster form of the body is made, and from this a cast-iron one. The latter is polished and two sheets of aluminium, representing the two lateral halves, bent on to it at a certain temperature. The frequent heating and hammering, together with the cylindrical shape, make the corset almost as strong as steel. The two halves are hinged in

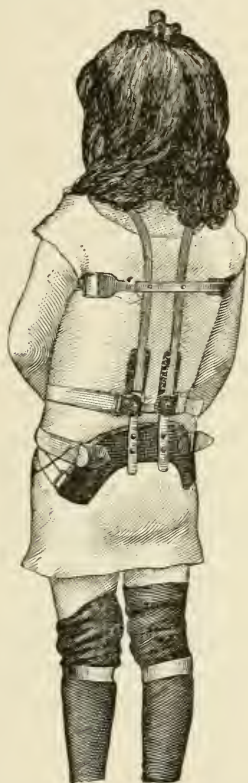


FIG. 1.

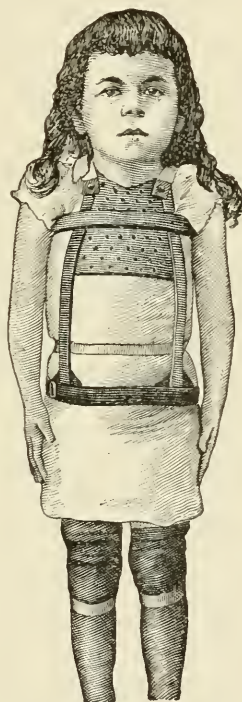


FIG. 2.

APPARATUS TO SUPPORT THE TRUNK DURING CONVALESCENCE. (SCHAPPS.)

New York Medical Journal.

the back, eyelets are punched in the front, and the corset is coated with shellac to render it impervious to moisture.

In reporting six cases of spinal caries treated by laminectomy Alfred Parkin, of Hull, ²_{Sept. 29, '94} concludes that, if the tuberculous focus can be eradicated from the vertebræ, there is every prospect of the result being permanent; otherwise relapses may take place or further tuberculous troubles may arise, as in tuberculous disease elsewhere.

Advanced cases of spinal caries, in which it is probable that a caseous mass exists, may be greatly benefited by laminectomy and the direct treatment of the diseased focus. The operation itself is not a difficult one, unless there is grave respiratory trouble. It does not interfere with the future stability or mobility of the spinal column; the disease for which such operation is performed may, however, do so.

Ménard¹¹⁸¹_{Feb., '95} has obtained excellent results in eighty cases of Pott's disease by the injection of camphorated naphthol into the unopened abscess. Simple though this method may seem, however, it requires certain precautions. A large trocar—the largest of Potain's, for instance—must be used, so as to give free exit to the softened tuberculous mass; puncture must be made at a point over which the skin is not thinned, in order to avoid consecutive fistulæ; the sac must be washed out with a boric-acid solution, carbolic acid and corrosive sublimate being avoided on account of their toxicity; when the fluid returns clear, from 30 to 60 grammes (1 to 2 ounces) of camphorated naphthol must be injected and the orifice closed with collodion. The walls and contents of the abscess soon undergo modification and completely disappear, testifying to the cure of the bony lesion of which it was a remote manifestation.

One injection, however, is very rarely sufficient, several being usually required, at longer or shorter intervals, according as the collection forms more or less rapidly. The injections are without pain and suitable for all cases, and should hence be preferred to injections of ether or the use of the curette. Though usually harmless, the treatment sometimes gives rise to symptoms of poisoning, such as loss of appetite, vomiting, profuse perspiration, etc.; one case ended fatally. Such instances are, however, exceptional, and Ménard asserts that the method should always be the one of choice.

Vincent¹⁴_{Oct. 28, '94} records 126 cases of Pott's disease,—18 cervical, 63 dorsal, 28 lumbar, and 17 involving different parts at the same time; 94 were treated by simple immobilization with or without injections; 32 only were operated on, either by simple drainage or by resection and curetting. Good results were obtained in all, with but one exception, in which death occurred.

Kirmisson, of Paris,⁸⁵³_{Nov. 1, '94} declares himself against surgical intervention in Pott's disease in children, believing that the best results can be obtained by means of iodoform injections.

A case of Pott's disease is recorded,³¹_{Dec. 7, '95} in a woman 75 years of age, complicated by a retropharyngeal abscess.

A case of Pott's disease is recorded by E. Hergenberg²⁰⁰⁰_{'94} in

which an abscess opened into the pleural cavity and the lung and was followed by vomicæ.

The history of the treatment of spondylitis and scoliosis by partial suspension and retention by means of plaster-of-Paris bandages, is reviewed at length by Lewis A. Sayre, of New York.

¹
Mar. 16, 23, '96

Paralysis in Pott's Disease.

William Thorburn, of London, ²_{No. 17, 48, '94} states that mere kyphosis is not usually competent to produce paraplegia. Sudden paraplegia may result, in rare instances, from fracture of carious vertebræ. The frequency of this occurrence is, according to Kraske, about 2 per cent. of the total number of paraplegias caused by vertebral caries. Still more infrequent causes are the bursting of an abscess into the spinal canal, hæmorrhage into the canal, and displacement of bony sequestra which press upon the cord. The most usual cause of paraplegia is pressure by granulation-tissue. In a few cases true tuberculous periarthritis is found within the cord, generally in association with tuberculous leptomeningitis.

In regard to the prognosis, his own experience has shown him that nearly all cases will recover if kept fixed in the recumbent position for a sufficiently long time, but the time required may be very prolonged. Cases in which the paraplegia is due to intramedullary tuberculous periarthritis can hardly be expected to get well, and those in which pressure has arisen from fracture of the carious bones are not very likely to improve to any great extent, while some of the other rare varieties of paraplegia are equally unfavorable.

Treatment.—Brissaud ²⁰⁸¹_{'94} emphasizes the fact that surgical intervention, as a general rule, is not indicated in cases of paraplegia due to Pott's disease, unless there be immediate danger to life. He urges against yielding to the temptation held out by successful operations, as yet too rare, since recovery after such intervention takes place so slowly that it may justly be demanded whether the surgeon is warranted in interfering. The repair of anatomical disorders and the return of function require months, not only in operation for vertebral tuberculosis causing meningeal symptoms, but also in trephining, resection, and laminectomy, absolutely indicated for extensive injuries of the spine.

F. Calot and Pierre, of Berck-sur-Mer, ⁸⁵³_{July, '96} quote the views of the most prominent orthopædists in favor of the treatment of paralysis in Pott's disease by means of rest and immobilization. Their experience in 20 cases treated by this method within four years is encouraging, 19 being either cured or on the way to

recovery and only 1 dying, the cause of death being the opening of an abscess into the bladder. They discourage opening of the spinal canal in these cases, the statistics of this operation showing a mortality of at least 50 per cent.

Loison, of Lyons, ³⁵_{Oct. 27, '94} ¹_{Nov. 17} describes the case of a young girl who for three years had had kyphosis of the dorsal region due to Pott's disease; also a slough over the sacrum. Application of Bonnet's splint was followed by an extensive outbreak of erysipelas and three abscesses, after which she recovered the use of her toes. A second attack of erysipelas was followed by additional improvement. After a third attack her condition was so much better that she could walk when her trunk was maintained by means of a corset. The improvement grew more and more decided, and at the time of the report the patient was able to do hard work. The author reports this case not only as a clinical curiosity, but also to show the curability of paraplegia due to Pott's disease by simple measures. The coincidence of the erysipelas and the favorable course of the vertebral disease should, he believes, not be ignored, however inexplicable they may be.

Thorburn ²_{No. 1748, '94} gives the following indications for operation:

1. A steady increase in symptoms in spite of favorable conditions and treatment.
2. The presence of symptoms which directly threaten life.
3. The persistence of symptoms in spite of complete rest is the indication which has been most commonly adopted.
4. In posterior caries (caries of the arches) operation is clearly indicated, as here we can readily both treat the paraplegia and remove the whole of the tuberculous tissue.
5. The existence of severe pain if the patient is being exhausted thereby.
6. Children, as a rule, yield better results than do adults.

Contra-indications: The presence of active tuberculous changes in other organs. Macewen holds that we should not operate in the presence of pyrexia. The exception to this would be if the cause of the pyrexia could be removed by operation. General meningitis will probably prove fatal whether an operation be performed or not. Cases of fracture of carious vertebræ are manifestly unsuitable for laminectomy, and most paraplegias of sudden onset will fall into this category.

V. Ménard, of Berck-sur-Mer, ⁸⁵³_{Mar., '95} ⁴⁵¹_{July} states that the difference in the effect upon the paraplegia in two cases in which he performed laminectomies—one in which a tuberculous abscess was opened and drained recovering rapidly and completely, while the other remained unaffected—led him to the conclusion that possibly the difference was due to the opening of the abscess, that the pressure of the abscess was the cause of the paraplegia, and that

its drainage would cure the distressing symptom. The theory based upon this reasoning was confirmed by two operations,—one in one of the foregoing cases of laminectomy where the abscess was found and opened and the paraplegia cured, and the other in a case upon which no former operation had been attempted and upon which only opening and drainage was performed. In both cases the paraplegia began to disappear immediately after the opening of the abscess-cavity. In further support of the theory and establishment of the utility and efficacy of this operation, the author reports three cases recently operated upon, in detail, in which the paraplegia had existed for a long time before the operation. The immediate result in these cases was that a few hours after the opening and drainage of these abscesses the patients felt a relief from oppressive feelings and a return of sensation in the lower extremities.

Transversectomy, the operation recommended by Ménard, was performed by Deschamps ¹¹⁹³_{Jan. 15, '95} on a child of 6 years, suffering from Pott's disease of the first dorsal vertebra, with paraplegia, dating back some months. Two transverse apophyses were laid open by a transverse incision of six centimetres, denuded, and removed, the adjacent ribs below being cut and pulled out from their insertion into the vertebra. The operation was followed by a return of sensation and motor power, but in several days the paraplegia returned and proved fatal, in spite of a laminectomy. At the post-mortem examination it was found that the last cervical and first dorsal vertebræ had almost completely disappeared, the former being twisted upon itself and pushed into the cord, thus causing the paralysis.

Two cases of laminectomy for Pott's disease are recorded by Jeannel, of Toulouse, ¹⁰⁴³_{Nov., '94} and another by Gray. ²_{Apr. 13, '95} The latter operator removed the fourth, fifth, and sixth dorsal arches. In six weeks a plaster jacket was applied and the patient allowed to go about on crutches.

Scoliosis.

Albert, of Vienna, ⁶⁵⁰_{Dec. 5, '95} remarks that Nicoladoni's researches show that the anterior longitudinal ligament is asymmetrical in scoliosis, being thicker on the side of the concavity and thinner on the side of the convexity, the bone being thick where the ligament is thin. The posterior median line was not correctly determined by Nicoladoni (who placed the anterior line in the middle of the ligamentous mass), because he had before his eyes the normal vertebra; but the vertebræ increase on the concave side in such a way that their ligaments do not give an exact idea of their

growth. In the normal vertebra the median line is formed by a vertical spine; in scoliosis the median line is no longer straight, but oblique. The torsion of the vertebræ is due to deviation of the root of the vertebral arch of the body of the vertebra, this deviation taking place at the epiphyseal groove, the remainder of the vertebra being divided in a symmetrical manner by the line of union. In oblique vertebræ there is observed a torsion of the bony tissue, and especially of the compact tissue. In a scoliotic vertebral column not only torsion, but a true rotation of bony tissue may be observed. The articular surfaces are sometimes thicker on one side, owing to the formation of a layer of bony substance. In looking at a vertebral column affected with scoliosis, one would say that the development of the spinous processes had been arrested, while that of the vertebral bodies had been exaggerated.

Hoffa,⁵⁴ Aug. 15, '95 alluding to the pathological anatomy of scoliosis, states that the greatest deviation is observed in the posterior lateral concave portion of the body of a vertebra. A central vertebral line shows a widening of the concave side of the half of the vertebral body, which comprises a portion of the semicircular root. The ascending surfaces of the articular process, on the concave side, are widened outwardly and pushed forward. The alteration in the spongiosa corresponds with the direction of the pathological incubus. Hoffa refers these changes to a torsion of the vertebræ around a diagonal axis.

L. H. Petit, of Paris,³⁵ Sept. 21, '95 having observed that most of his patients with scoliosis—girls between 10 and 15 years—were also affected with a general weakness of the joints, dilatation of the stomach, and neurasthenia, came to the conclusion that the neurasthenia—perhaps the cause and perhaps the effect of dilatation of the stomach—had led to a generalized muscular paresis. If a primary dilatation of the stomach be admitted, it may be that the toxins from this affection acted reflexly on the nervous system, and, through it, on the muscles. Paralysis was never present,—simply a weakness of the muscular system. The nervous antecedents of many scoliotic patients lead the author to believe that neurasthenia is the primary affection in these cases. Be this as it may, the weakened muscles being no longer able to aid the ligaments in supporting the articular surfaces, stretching of the ligaments naturally follows, and from this fact arises scoliosis, flat-foot, certain cases of genu valgum, abnormal mobility of the hip, shoulder, elbow, etc.

In an article on deviation of the vertebral column in healthy subjects Paul Richer, of Paris,⁴⁵² May, June, '95 states that he studied 40

perfectly healthy individuals as regards musculature and external form. In only 2 of these was the spine perfectly straight. In all the others there was a lateral dorso-lumbar curvature, the convexity being turned toward the left side. This curvature was slight in 8 of the cases, but well marked in all the rest. Perfect symmetry of the subscapular region is also rare, Richer observing it in only 1 case.

Treatment.—Lannelongue, of Paris, ¹⁴_{July 31, '95} is convinced that scoliosis never undergoes retrogression after it has reached the second degree, and, hence, that therapeutic efforts should be directed exclusively toward preventing the deformity from increasing. Gymnastics should be proscribed. The ideal position is the dorsal decubitus, combined with a suitable apparatus; but, unfortunately, this method has the defect of compelling the patient to remain lying down for months or even years.

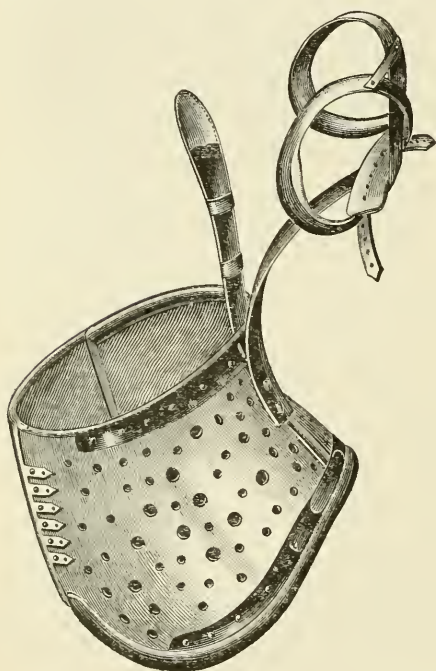
N. Wilbur, of Fayetteville, N. Y., ¹_{Dec. 8, '94} after a study of his own case, concluded that it arose from the habit he had formed of always sleeping on one side. Since that time he has found that three other patients have had this same habit, and from the circumstances in each case is convinced that this was the cause of the curvature. In all, the curvature conformed to the position occupied in bed. He believes that inquiry would show that a large portion of cases are due to this cause. The recognition of lateral decubitus as a cause suggests that the patient, by sleeping on his other side, can grow straight again. By reversing the position the spine is not simply straightened, but it is bent over in the opposite direction, which is more effective. In certain cases, in addition to this treatment by position, the muscles need developing by gymnastic exercises and a general tonic course of treatment. This is required when the patient has backache. The younger the patient, the more quickly will the curvature be overcome. The author adds two cases showing the value of the treatment.

Delore, of Lyons, ²¹¹_{July 21, '96} advanced the idea that cure may be obtained by stretching the ligaments and the periosteum and causing compensatory ossification on the opposite side. He proceeds as follows in a case of curvature convex to the right in the dorsal region, with compensatory curves to the left in the cervical and lumbar regions: The patient is anæsthetized and placed upon a low table, upon the left side, with pillows under the shoulder and pelvis. Strong pressure is then made upon the convexity in jerky movements. The old adhesions are thus broken up and the articulations of the ribs and vertebræ are mobilized. Sometimes an apparent correction of the deformity is obtained rapidly; sometimes there seems to be no improvement, and a great deal of force must

then be used to overcome the pathological rigidity. In some cases the author found it necessary to use certain levers for this purpose.

The thorax of children is very pliable, and in all his operations, some of which have been very severe and prolonged, the author has never had any accidents, although at first he feared fracture of the ribs, or diastasis of the vertebræ with spinal-cord injury, or interference with the lungs, heart, or great vessels.

C. I. Tisell, of Algiers, ⁷⁰_{Dec.15,'95} states that massage gives remarkable results in beginning cases of scoliosis by strengthening the muscles and ligaments of the spine. Like all other methods, however, it is not in itself sufficient, being only an adjuvant, though very efficacious, acting rapidly in old cases of rigid scoliosis with pain and contractures. Its general effect is to awaken and maintain the nutrition of the muscles of the thorax.



CORRECTING APPARATUS. (DOLEGA.)

Therapeutische Monatshefte.

The treatment of postural deformities of the trunk by means of rapid and thorough physical development is considered by Jacob Teschner, of New York, ⁹⁶_{Aug., '95} who has thus obtained a complete cure in several cases.

Dolega, of Leipzig, ¹¹⁶_{May, '95} recommends systematic gymnastics in the treatment of habitual kyphosis, with the use of correcting apparatus and, in certain cases, of

prothesis. The best-known apparatus of this kind is Nyrop's, but it has the disadvantage of being supported by a belt which does not correspond to the anatomical relations. Dolega has himself had prepared an apparatus in which the pelvic belt exactly corresponds to the form of the body, the elastic dorsal spring having its point of support on this belt. (See illustration.)

Spina Bifida.

Pathology.—Mayo Robson ⁹⁶_{July, '95} states that a larger experience has confirmed the view which he had already enunciated,—that a

majority of the cases were instances of meningocele rather than of myelocele.

A case of spina bifida of the sacro-coccygeal region is recorded by Vaton.³⁶³_{No.10,'95} According to Duplay and Baume, no case of this kind had been hitherto observed. Vaton's patient was an eight months' child that died shortly after birth. The tumor was situated at the level of the sacrum, which was clearly divided, and extended to the level of the coccyx, which was absent. It was thus manifestly a case of coccygeal spina bifida.

In a case seen by Robert Edwards, of London,²_{Nov.30,'95} post-mortem examination showed the following conditions: The tumor communicated with the interior of the skull by passing through the foramen magnum and an opening in the neural arch of the atlas. The foramen magnum did not appear to be unusually dilated, the neural arches and formation of all the other cervical vertebræ being normal, neither was there any abnormality of the occipital bone, the torcular Herophili and the sinuses being complete. Spina bifida of the lumbo-sacral region is fairly common, but becomes rarer the higher the situation. In the Museum of the Royal College of Surgeons, among the specimens of the malformations, there is a specimen of a ligatured spina bifida occurring at the sixth and seventh cervical vertebræ, but Edwards can find no record of a case occurring above this position except accompanied by hydrocephalus or considerable malformation of the skull. In this case there was no other abnormality in the skull or elsewhere.

In a case recorded by W. J. Thompson, of Dublin,¹⁶_{May,'95} the points of interest are: (1) situation of spina bifida in dorso-lumbar region; (2) paralysis of lower extremities only with eversion; (3) coincident development of the hydrocephalus; (4) the enormous nævus on a former child of the same family.

An unusual complication of a lipoma and a spina bifida is described by C. Lindsey, of Lewistown, Mont.,¹_{Aug.25,'95} in a man aged 35 years. A small fatty tumor about the size of a hen's egg was freely movable under the skin and apparently had no communication with the spine. A careful dissection around the tumor and on the under side revealed a small spina bifida intimately connected with it, and in which the author accidentally cut a small opening in trying to separate them. There was an escape of about half an ounce of spinal fluid, which he stopped by snapping an artery-forceps on the opening. He then finished the removal of the tumor.

Treatment.—In an article on plastic operations for spina bifida Mayo Robson⁹⁶_{July,'95} ⁸⁰_{Oct.15} states that, a majority of the cases being instances of meningocele rather than of myelocele, they are

therefore more amenable to radical treatment. The use of Morton's fluid is not recommended, on account of the danger attending its use. A number of cases are known to have died on the table while being subjected to this operation, while others have succumbed to a rapidly developing hydrocephalus. The author states that a continued experience leads him to say that nearly all cases calling for interference may be treated by excision of the whole or part of the sac, or by some modification of this, with a great probability of success. The author has operated on twenty cases by this method, with but four deaths. For practical purposes it is convenient to divide all cases of spina bifida into three classes:

1. Those where an operation is not necessary, as in cases where the sac is small and well covered by a firm pad of the integuments.
2. Those where operation is not advisable, as in fissure of the whole or a considerable part of the spinal column or where there is well-marked hydrocephalus or paraplegia.
3. Those in which operation is indicated, as (*a*) in meningocele, whether the opening in the spinal canal be large or small; in the one case meningeal, separate from integumental, flaps being formed; in the other the pedicle of the meningocele being ligatured and the subcutaneous tissues and skin brought together over this by separate sutures. (*b*) In cases where the coverings are thin and translucent, even when this condition extends to the margin of the tumor, operation is advisable, as by rendering aseptic the thin covering it may be partly utilized, if required, to form the meningeal flaps, when the adjoining skin can be undermined and made to slide over the new meninges. (*c*) In cases where the cord is expanded or nerves are blended with the sac, excision of redundant parts or incision between manifest portions of nervous structures reduce the tumor and enable it to be placed in the canal, and usually there is no difficulty in covering the replaced structures.

It is of the utmost importance to render the parts aseptic, as a preliminary to operation, and to observe the strictest antiseptic precautions at the time of operation and subsequently. In most cases a silver or celluloid shield should be worn for a time after healing is completed, in order to protect the cicatrix and to prevent it from bulging.

H. O. Marcy, of Boston, ⁹⁶_{Mar., '95} argues that failures in the past seem to have been mainly due to septic infection. The lower the opening in the canal, the greater the hydrostatic pressure; the higher the opening, the less the liability to return. The sac of the tumor being in direct continuity with the spinal canal, the fluid contained therein is in intimate relation with that surrounding the great cerebral centres. Undue loss of fluid may, on that account,

cause sudden death from disturbance in intra-cranial organs. In the author's opinion, a free dissection is necessary by means of elliptical incisions on either side, ample lateral flaps being reflected right down to the base of the tumor before opening the sac. The patient's head being slightly lowered, the sac should be emptied by a trocar. Certain portions of the cord may be spread out on the inner wall of the sac, and should be dissected off and returned to the spinal canal. The base of the sac is next ligatured by a double, continuous tendon-suture. The sac is then cut away. The stump is closed down on either side to the strong fascia, the wound closed with buried sutures, and, the skin coapted in this way, the whole is sealed with iodoform collodion.

Roswell Park ¹⁷⁰_{Aug., '95} publishes a case of spina bifida treated by an operation which consisted in complete extirpation of the external portion of the sac, its central and most protruding area being removed by an elliptical incision. A thin piece of celluloid, previously sterilized and cut in such a way that it could be sprung into the vertebral opening, which was freshened for the purpose, was then fitted into the osseous defect.

A successful operation on a spina bifida is reported by S. B. Woodward, of Worcester, Mass., ⁹⁹_{May 9, '95} and another by T. J. Field, of Fort Worth, Texas. ¹⁴³_{Oct., '94} James K. Young, of Philadelphia, ⁸⁰_{Apr. 15, '95} cured a case by excision. A case of large spina bifida, with excision and recovery, is described by F. W. Ramsay, of Bourne-mouth. ²_{June 1, '95} A successful extirpation of a large sacro-lumbar spina bifida is recorded by Tansini. ⁵⁸⁹_{Aug. 6, '95}

Broca ³_{Oct. 17, '94} considers hydrocephalus, often associated with spina bifida, as the main cause of failure after the operative treatment of the latter condition, while the results of surgical treatment of hydrocephalus are very discouraging, as demonstrated by several cases cited. The author holds that operative treatment is contra-indicated in cases of spina bifida in which the tumor is covered by normal skin, so long as there is no risk of rupture, and also in cases in which rapid increase of swelling indicates hydrorrhachis, which condition always leads to incurable hydrocephalus. The only cases of spina bifida, therefore, in which an operation is indicated are those in which the swelling has ruptured or is on the point of doing so.

Spina Bifida Occulta.

G. Bohnsted ²⁰_{V. 140, Apr. 2, '95}; ⁷⁵_{June 15} reports a case of spina bifida occulta, in a young man of 20, which, in consequence of degeneration of the ano-vesical centre in the conus terminalis, resulted in suppurative cystitis ending in death. The author minutely describes the

anatomo-macrosopical and microscopical conditions, particularly that of the swelling of the lower end of the spinal cord, caused by union with the outer soft tissues. This tumefaction was in the region of the cleft, from the third sacral vertebra downward, and was inclosed in a mass of fat, muscles, and connective tissue, which greatly compressed the nerve-elements, thereby causing an ascending degeneration of the posterior column. The diagnosis of spina bifida was only established at the autopsy.

Description of Plate.—Fig. 1. Median section of the pelvis, right half, half natural size (the soft portions of the left gluteal region are cut a little beside the centre); *v l s*, fifth lumbar vertebra, body; *p s s*, spinous process of the same; *o c*, coccyx; *i l*, os ilei; *d*, dura mater; *t*, tumefaction of lower end of cord; *v*, region of the adhesion of the latter to the surrounding soft portions; *n s l*, first sacral nerve, the roots of which extend upward to the first sacral foramen; *s*, symphysis; *v e s*, urinary bladder with thickened walls; *d u*, diverticulum of bladder; *u*, widened portion of the urethra; *c s*, colliculus seminalis; *r*, rectum; *v s*, the left severed seminal vesicle.

Fig. 2. Cross-section in the lower end of the spinal cord, slightly above the tumefaction (in the region of the letter *d* in Fig. 1); *c*, central canal; *l v s*, left anterior column; *l v h*, left, *r v h*, right anterior horn; *l v s*, left posterior column; *l h*, left, *r h*, right posterior horn; *r h w*, right posterior root; *d*, dura mater; *f*, fatty tissue; *a*, arteries; *v*, veins.

Jackson Clark ²⁶_{Nov. 1, '95} observed an instance of spina bifida occulta with which were associated other deformities. The laminae of the last three lumbar and all the sacral vertebræ were wanting, and opposite the first sacral the dura mater and arachnoid were prolonged backward into a narrow tube which ended in a scar in the skin. The child was born alive and lived for twenty minutes. There was no liquor amnii.

NECK AND UPPER EXTREMITIES.

Torticollis.

D'Arcy Power ²⁰⁵⁶_{v. 76} records fifteen cases illustrating the relationship existing between wryneck and congenital hæmatoma of the sterno-mastoid muscle. Of 106 recorded cases of hæmatoma of the sterno-mastoid muscle, in 20 death occurred too soon for wryneck to have become apparent; in 47 wryneck was looked for, but not found; and in 23 cases wryneck occurred, but in 4 of these it was so slight and transient as to be unimportant. The cases observed by the surgeons just named number 30, of which 11 eventually developed wryneck, but in 2 of the 11 cases the torticollis was so slight that it was hardly worth while taking it into account, while in 4 cases it was necessary to divide the tendon. Power draws the following conclusions: 1. Hæmatoma of the sterno-mastoid muscle may be due to intra-uterine injuries, which are rare, or to injuries at the time of birth, which are common. 2. Congenital

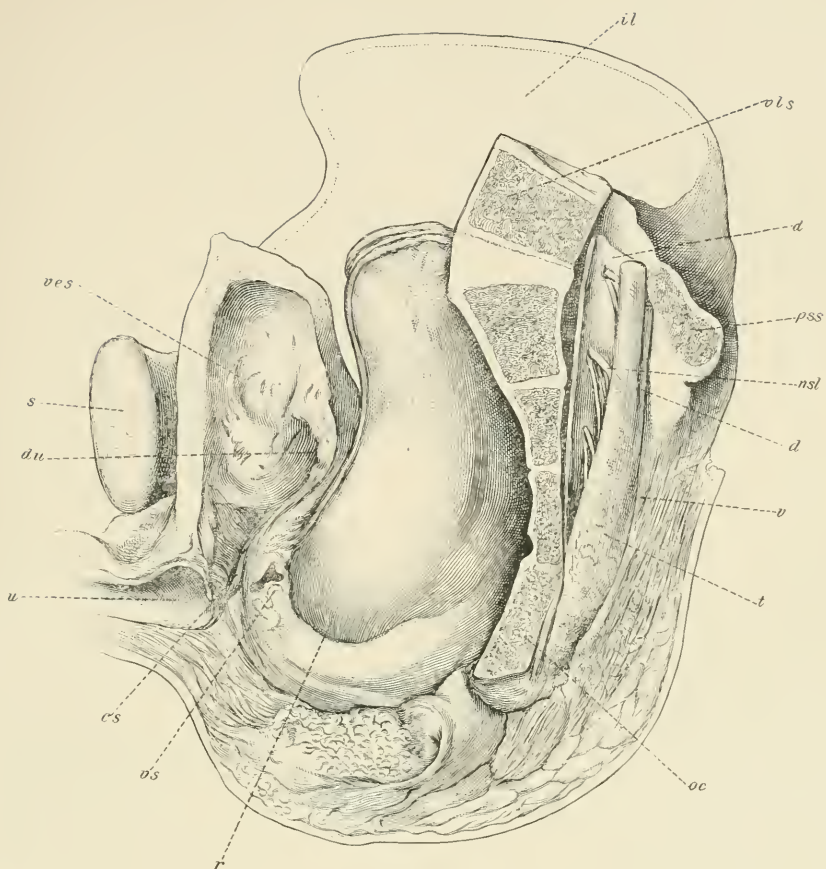


Fig. 1.

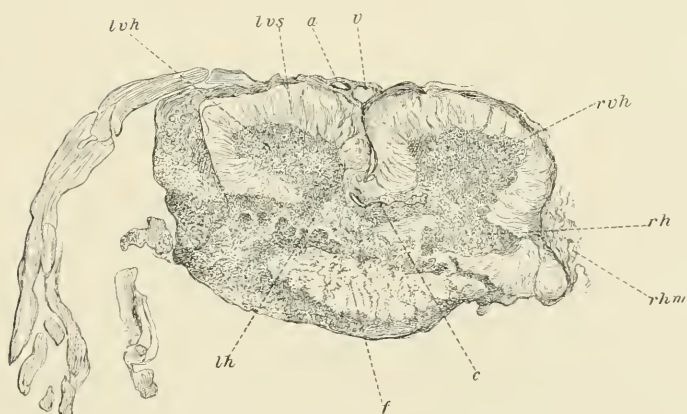


Fig. 2.

Spina Bifida Occulta (Bohnsted).

Virchow's Archiv.

hæmatoma of the sterno-mastoid muscle occasionally predisposes to wryneck in children who are otherwise healthy. 3. Wryneck thus caused varies in degree from the slightest and most transient form to one of such severity as to require tenotomy of the muscle for its cure. The wryneck is not—so far as he has seen—accompanied by asymmetry of the face.

Diagnosis.—Lannelongue, of Paris, ¹⁴_{Aug. 21, '95} alludes to rheumatism of the vertebral articulations of the neck as a source of error in establishing a diagnosis in some cases in which torticollis is suspected. According to him, the former condition is often overlooked, and he emphasizes the importance of carefully observing the appearance and progress of the symptoms in doubtful cases, in order to diagnose correctly between a muscular torticollis and arthritis of the first cervical joint.

Koettnitz, ⁴⁰⁴_{No. 88, '94} from several personal cases, admits the frequent coincidence of shoulder presentations and torticollis. Contrary to Petersen, who regards all torticollis as of congenital origin, Koettnitz makes two divisions,—that due to a cause exercised during intra-uterine life and that produced during labor by a lesion of the muscle.

Pincus, of Dantzig, ³⁹³_{B. 31, H. 2, '95} believes that slight damage to the sterno-mastoid muscle may be frequent, but injury sufficient to produce marked symptoms is rare. Two distinct morbid conditions follow this injury,—hæmatoma, where inflammation is secondary, and chronic traumatic myositis, which represents primary inflammation. The lesion has nothing to do with syphilis. Damage to the sterno-mastoid is an accident which must be guarded against; obstetricians must teach and practice the use of properly-made forceps, avoidance of twisting of the neck, and intelligent manipulation of the child when manual interference is needed.

Rachitic torticollis forms the subject of a paper by Legay, of Lille, ³¹_{Jan. 25, '95} who finds that this localization of rachitis is rare and its diagnosis often difficult, especially when the torticollis is the only manifestation of the disease. If, several months after the appearance of wryneck, the epiphyses begin to swell, the legs become deformed, or other symptoms manifest themselves in the thorax, abdomen, or any other part of the body, or in dentition, the clinical picture of rachitis is complete, and a diagnosis of rachitic torticollis can be made, even though the condition has disappeared under local treatment.

Treatment.—Noble Smith ²⁶_{Nov. 1, '95} recalls the fact that he had, in 1891, endeavored to show that all treatment hitherto adopted for long-standing spasmodic torticollis had failed, with the single

exception of one patient operated upon by the late Campbell de Morgan, who excised a piece of the spinal accessory nerve of the affected side. Smith then recorded a case in which most severe spasms had existed for sixteen years, and, having tried all the usual remedies, he had operated upon the spinal accessory nerve, removing a piece a third of an inch long. The spasms in the sterno-mastoid ceased and the patient was greatly relieved, but spasms of the posterior rotators of the neck on the opposite side still existed, and he subsequently excised pieces of the external divisions of the second, third, and fourth posterior branches of the cervical nerves, and divided all twigs of nerves entering the under surface of the splenius capitis. All spasms now ceased. He has seen the patient from time to time up to quite recently, and she has been perfectly cured from her very severe affliction. Upon her last visit to him, about three months before his report, power of movement in the sterno-mastoid had somewhat returned, showing regeneration of nerve-fibres. At the same time there was no return of spasm. Since the above case was first reported he has operated upon several cases, all practically successful.

M. H. Richardson and G. L. Walton, of Boston, ⁵_{Jan., '95} in a review of the treatment of torticollis, present the following conclusions: 1. Palliative treatment, whether by drugs, apparatus, or electricity, will rarely prove successful in well-established spasmodic torticollis. 2. Massage may prove of value in comparatively recent cases. 3. Resection affords practically the only rational remedy. 4. Operations on the spinal accessory nerve may afford relief, even if other muscles than the sterno-cleido-mastoid are affected; on the other hand, the affection previously limited to the sterno-cleido-mastoid may spread to other muscles in spite of this operation. 5. No fear of disabling paralysis need deter us from recommending operation, as the head can be held erect even after the most extensive resection. 6. The most common combination of spasm is that involving the sterno-mastoid on one side and the posterior rotators on the other, the head being held in the position of sterno-mastoid spasm, with the addition of retraction through the greater power of the posterior rotators. 7. It seems advisable, in most cases, to give preference to the resection of the spinal accessory as the preliminary procedure.

Mikulicz, of Breslau, ³³⁶_{Jan. 5, '95} states that in severe cases of torticollis the only treatment that is of any use is extirpation of the contracted sterno-mastoid. He comments on the unsatisfactory nature of the ordinary treatment of wryneck either by subcutaneous or open division of the muscle, and also on the difficulty of the after-treatment, relapses constantly occurring as a result of

the contraction of the cicatricial bond of union between the divided ends. In the earliest cases attempts were made to save the upper portion of the muscle if it gave any evidence of electrical excitability, and, in some instances, it was forcibly stretched so as to enable the lower end to be stitched to the clavicle. But such a procedure was soon found to be unadvisable, owing to the tendency to subsequent contraction arising from the extension of the sclerosing process to the portion of the muscle left behind. In two patients marked relapses followed a partial operation, necessitating complete extirpation at a later date.

Since April, 1891, this surgeon has treated 25 cases of torticollis: 22 congenital, 3 acquired. Of these, 3 yielded easily to orthopædic treatment: 5 were treated by subcutaneous tenotomy; 17 by extirpation (8 partial, 9 total) of the muscle, and in the whole 17 the result was satisfactory. Where no secondary changes in the vertebræ existed, the restoration of the normal position of the head was rapid. A flattening of the side of the neck resulted from the removal of the muscle. Massage and passive movements were employed in the after-treatment of most cases, but toward the last only in cases in which there were organic changes in the shape of the bodies of the vertebræ.

Lorenz ³³⁶_{Feb. 2, '95} strongly objects to the treatment of torticollis by extirpation of the sterno-mastoid mainly from the fact that such an operation can in no way remedy the spinal curvature, which he considers such an essential item in the more serious cases. The plan recommended by him consists in a forcible reduction of the cervical scoliosis by gradual lateral pressure, so as to mold the affected vertebræ into shape. This is conducted under an anæsthetic after the tenotomy or myotomy has been completed. The head is grasped by the hands of the operator and, by the use of carefully regulated force, displaced until it rests on the shoulder of the side which formerly constituted the convexity of the cervical curve. Time and patience must be used in order to accomplish this, but in most young subjects it can be successfully completed in half an hour. The head and neck are then fixed in a suitable mechanical appliance, and active movements allowed after a time.

The surgical treatment of torticollis, with especial reference to the spinal accessory nerve, is considered by Ellsworth Eliot, Jr., of New York, ⁹⁶_{May, '95} who emphasizes the importance of orthopædic treatment. When by operative measures the head is brought into the median plane again, it must be kept there by the wearing of a splint that will hold it firmly in place and will, by giving perfect rest, favor the complete and rapid union of the wound. That such union should be primary is of the greatest importance.

Secondary union would be attended by the formation of cicatricial tissue, the subsequent contraction of which would be difficult to govern. By means of suitable apparatus not only is a tendency to recurrence prevented, after complete union has taken place, but the stretching of bands of fascia that have escaped the surgeon's knife is accomplished and all subsequent trouble from this source averted.

Heinrich Weiss, of Vienna, ⁶_{June 8, '95} publishes a case of spasmodic torticollis treated by curare. As arsenic, bromine, and faradization of the left side had been used without any success, nerve-stretching was performed. The right accessory nerve, which was stretched, was found to present a peculiar condition,—that of hyperlymphosis nodosa. A too forcible operation being hazardous, only the bundle of fibres at the place of entrance into the muscle was stretched. Three weeks after this operation the previous symptoms returned, and Weiss injected a solution of curare (half a Pravaz syringeful) into the neck. The solution contained 0.15 gramme ($2\frac{1}{4}$ grains) of curare and 10 grammes (167 minims) of water. The injection was made every two days; the patient's condition improved from day to day, and at present he is entirely free from torticollis. As for the strength of the preparation, the solution is to be straw-colored. At first half a syringeful is to be injected, and the amount is to be increased until tremulousness is induced.

Scapula and Humerus.

With regard to the etiology of elevated scapula, Kölliker, of Leipzig, ³³⁶_{July 6, '95} agrees with Sprengel, who refers the congenital variety to an insufficient quantity of amniotic fluid, and consequent twisting backward of the arm by the uterine walls. The malformation of the shoulder-blade is of a secondary nature. Kölliker alludes to two cases previously reported by him in which the condition was ascribed to the formation of exostoses in the upper median angle of the scapula. He states that he lately met with a third case resembling those previously described which he treated by resection of the exostoses. During the operation he obtained a further insight into the trouble, and it became evident that the supposed exostosis was the scapula itself. The inner upper angle was rather longer than the normal, and was bent forward so that it could easily be mistaken for an exostosis extending toward the clavicle. After resection of the bone the scapula could immediately be pushed down considerably.

In a case of congenital dislocation of the shoulder observed by Arbuthnot Lane, of London, ²_{Jan. 30, '95} the outer half of the right

clavicle formed with the inner half an angle of about one hundred degrees. In consequence of this the right shoulder was placed up considerably above the level of the left, giving the child a singularly asymmetrical appearance which was most deforming. The form of the right chest, especially that of the scapula, was very much altered. The clavicle when exposed showed no evidence of having been fractured, and the parents asserted that the deformity was as marked at the birth of the child as it was before the operation.

A. M. Phelps, of New York, ⁵⁹_{Sept. 21, '95} treated a case of congenital displacement of the shoulder by replacement after trimming the head of the humerus.

A congenital dislocation of the shoulder backward was treated by Frederic Eve, of London, ²_{Sept. 21, '95} by excision of part of the elongated and flattened humerus.

A case of congenital subspinous dislocation of the head of the humerus is recorded by John B. Roberts, of Philadelphia, ⁹⁶_{Dec., '95} who states that the condition, which is either uncommon or frequently overlooked, is probably a malformation similar to that which exists in the so-called congenital dislocation of the hip. The subspinous or subacromial variety, to which the case belongs, is said to be less frequently seen than the subcoracoid.

Schwartzel, of Altona, ³⁴_{V. 42, No. 17, '95}; ¹³_{Aug. 15} reports a case of pseudarthrosis of the right humerus in a man 45 years old. After several abortive operative attempts to cure the false joint—situated just a little above the middle of the upper arm, as shown on next page—the patient gradually acquired such dexterity in the use of the affected arm that any further operative measures have become unnecessary. The arm can now be moved at the spot of the false joint at a right angle in any direction, without the patient feeling any pain. The manner in which this man can, notwithstanding this condition of pseudarthrosis, execute the most varied movements and feats of strength with his right arm is fully described and illustrated by a series of engravings in the original article.

In discussing the question of irreducible dislocations and their treatment by arthrotomy, Championnière, of Paris, ¹⁴_{Mar. 10, '95} stated that it is important to take into account the date of the accident, and that, although arthrotomy may give good results in comparatively recent cases, he would not hesitate to reject it for total resection in older cases, from the fact that the after-course is always more favorable. When operating on the elbow it is quite useless to resect the head of the radius; when operating on the shoulder the resection must be complete, especially if any bony lesion be

suspected. The restoration of movements will be much more satisfactory by this plan. Félizet shared the speaker's opinion as to the superiority of total resection over arthrotomy in adults, but would be somewhat more reserved in the cases of children. In three such instances of elbow dislocation, in which he performed only partial resection, the results were excellent. He did not touch the bones of the forearm, but simply removed one centimetre of the articular surface of the humerus from the two extremities. Such a procedure appeared to him more correct and more likely to avoid the production of a double joint. Marchand



PSEUDARTHIROSIS OF HUMERUS. (SCHWERTZEL.)

Münchener medicinische Wochenschrift.

stated that all old dislocations are not irreducible, as he had readily reduced one twenty-five days old, and one twenty days old in a woman of 63 years. He had performed resection twice with good results,—similar to those of Championnière. Quénu expressed the opinion that the date of the dislocation was of little moment, but that if reduction could not be effected he would intervene before secondary lesions occurred, having recourse to bloody measures if necessary. While agreeing with the last speaker, Ricard believed that irreducible dislocations should be divided into two groups, as regards the method to be employed. In old

cases, which are nearly always accompanied with alterations of the bony surfaces, resection seemed to him preferable; while for recent cases simple arthrotomy would often be sufficient. He had found it so in two cases in which the dislocation dated back only some weeks. Kirrison said that he would first try all bloodless measures in cases of from fifteen to twenty days' standing, and generally could thus succeed in reducing the dislocation. If, however, operation were found necessary he would follow Ricard's plan, performing arthrotomy in recent cases in which the bones have not altered or the cavities disappeared, and resection in old cases, preserving as much as possible of the bone in children. He had had excellent results in several cases of partial resection.

Elbow and Forearm.

It is well known that dislocations of the elbow easily become irreducible, even in a short time. Tillaux has noted a case of eight days' standing in which he was unable to reduce the dislocation under chloroform. Nélaton has attributed the difficulty of reducing old dislocation of the elbow principally to the adhesions between the anterior portion of the epiphysis of the humerus and the *débris* of the anterior capsule, lined with the deepest fibres of the anterior brachial. Ollier, of Lyons, ¹⁴_{June 30, '96} believes that the cause is to be found in the ossification of the periosteum torn away with the ligaments, thus forming a column of bone which acts as a firm obstacle to all attempts at reduction. Lyonnais noted that in dislocation three months old in infants and adolescents this bony column was very solid and had the consistence of the normal humerus. He believes that it is only in the first fifteen days that the ossification is soft enough to yield to traction. On the other hand, periosteal ossification never becomes absorbed. In old dislocations this ossification necessitates resection of the dislocated end of the radius, the lower extremity of the humerus, and of this humero-radial osseous formation, in order to effect complete reduction. In children an extensive resection must be made to preserve the movements of the joints, otherwise resection will again become necessary later on. Care must be taken to destroy any osteophytic shoots which might lead to bony ankylosis.

Tillaux, of Paris, ⁶⁷_{Oct. 15, '96} recommends arthrotomy in old unreduced dislocation of the elbow. The ideal plan, in his opinion, would be to expose the articular surfaces, liberate them from adhesions, and replace them in the normal anatomical position. This is rarely obtained in reality, however, and, if complete reduction cannot be made, the best thing after it is resection of the lower end of the humerus, which will accommodate itself to the ulnar notch.

If this operation cannot be done, then the ulnar notch and radius must be resected if necessary.

L. W. Hotchkiss presented to the New York Surgical Society ⁹⁶_{Dec., '95} a girl, 9 years of age, whom he had subjected to arthrotomy for the relief of an irreducible, backward dislocation of both bones of the forearm at the elbow which had been sustained five weeks before. The patient had a strong, useful joint, and the range of motion might be expected to increase materially under daily use.

A case of congenital absence of the radii is described by S. L. McCurdy, of Pittsburgh, ¹_{Sept. 28, '95}.

Hand.

In a paper on metacarpo-phalangeal resection for irreducible dislocations of the thumb Ch. Amat ²⁴³_{Sept., '95} states that it is easy to understand how anything but resection would be useless in cases of long standing. By means of antisepsis the articulation may now be exposed without any danger of causing disorders which formerly proved fatal or even simple suppuration, which caused ankylosis of the joint. For this reason he believes that there can be no possible objection to arthrotomy and resection,—the most efficacious measures in these cases.

Tubby ⁶_{May 4, '95} reports a case of contracted elbow, wrist, and fingers following pressure on the median nerve by scar-tissue. The case is of considerable surgical interest on account of the cause of the contraction and its duration, the difficulty of finding the site of lesion of the nerve, and the extensive dissection required; but it is chiefly of value as showing that clean division of all the tendons on the flexor aspect of the wrist gives a satisfactory result, and that both flexion and extension of the fingers can be fully restored after so radical a procedure.

Paul Coudray, of Paris, ¹⁶²_{Aug. 25, '95} reports a case of congenital flexion of the little finger, in which phalango-phalangeal resection was followed by a good functional result.

LOWER EXTREMITIES.

Hip-joint Disease.

Diagnosis.—Kirmisson stated before the Paris Surgical Society ¹⁴_{Mar. 17, '95} that Vincent ⁷⁰_{Feb. 3, '95} had presented a paper in which he attempted to demonstrate that the classical position of the limb—that is, flexion with abduction and rotation outward—was often absent in the beginning of coxalgia. According to Vincent, flexion with adduction and rotation inward was quite frequent,

and was in relation to the preponderance of lesions of the cotyloid cavity and the opening of ossifluent abscesses. Kirrnisson, however, stated that personally he had but seldom observed flexion with adduction, and he could not understand how lesions of the cotyloid cavity could determine such a position. As to the relation between this attitude and opened abscesses, numerous cases could be cited which would not confirm Vincent's theory. The latter had reported twelve cases which might be considered as valuable, it is true, in supporting his view, though in some of them the details of the onset of the affection were wanting.



PLANTAR IMPRINTS OF RIGHT AND LEFT FEET IN A CASE OF HIP-JOINT DISEASE.
SMALLER FOOT ON DISEASED SIDE. (VINCENT.)

Archives Provinciales de Chirurgie.

Vincent, of Lyons, ¹⁰⁴³_{Oct. 1, 195} also made researches in a series of cases tending to show that the imprint of the foot indicated, in cases of coxalgia, atrophy and arrest of growth of the foot on the side on which the hip had been resected. This condition has been demonstrated by the production of a certain number of imprints of the foot taken at periods more or less remote from the beginning of the coxalgia and of the resection. The arrest of growth refers to the skeleton of the foot, both as to its length and thickness. (See illustration.)

An examination of the calcaneum distinctly shows the arrest

of the development in length and thickness. This evident atrophy of the bones is measured with difficulty as to mathematical precision, because it is accompanied with atrophy of the soft tissues. The muscles and the adipose tissues suffer a marked loss of development.

The atrophy and the arrest of growth of the foot, in the author's opinion, constitute a sign of coxalgia; in a general sense these phenomena seem to be in proportion to the gravity and to the duration of cases of tuberculous coxalgia or strepto-staphylo-coxalgic disease.

The arrest of growth in the foot is not a symptom peculiar to coxalgia; it may be found during the period of growth accompanying all the affections of the joints in the lower limbs, whether inflammatory or not, and of all the prolonged inflammatory affections of the bones in their diaphyses in the lower limbs. Vincent has had no opportunity to observe cases of degeneration from malignant causes.

[A part of this atrophy should be attributed to disease irrespective of inflammation of the bones. The same atrophy is to be observed in club-foot and unilateral congenital dislocation of the hip where the weight has been kept off the leg by apparatus.—R. H. S.]

Resection.—Resection of the hip in coxalgia is considered by A. Lambotte, of Antwerp, ⁸⁶⁸_{v. 4, No. 3, '95} in a comprehensive monograph based upon a review of the results obtained from 12 personal cases, 11 successful, and also from a study of the literature of the subject. He states that even the partisans of conservative treatment agree that the results of such treatment are far from being brilliant. Among them Bruns, of Tübingen, from a consideration of 600 cases, recognizes that the method has serious inconveniences. The mortality, according to him, is 40 per cent., the length of treatment about four years on an average, the orthopædic results sometimes disastrous, and the restoration of function never perfect.

[In the United States perfect cures of hip-joint disease after orthopædic treatment have been reported in many instances by almost all the prominent orthopædic surgeons.—R. H. S.]

A similar confession from surgeons whose dexterity and experience cannot be questioned proves that resection of the hip gives still worse results. (See ANNUAL of 1895, vol. iii, G-8.) And yet the bloody method has proved wonderfully efficacious in other joints, no other measures being comparable in the elbow, shoulder, and even the knee. What is the cause of the inferior results from surgical intervention in hip-joint disease? Does the tuberculosis act differently from that in other articulations? Such a supposition

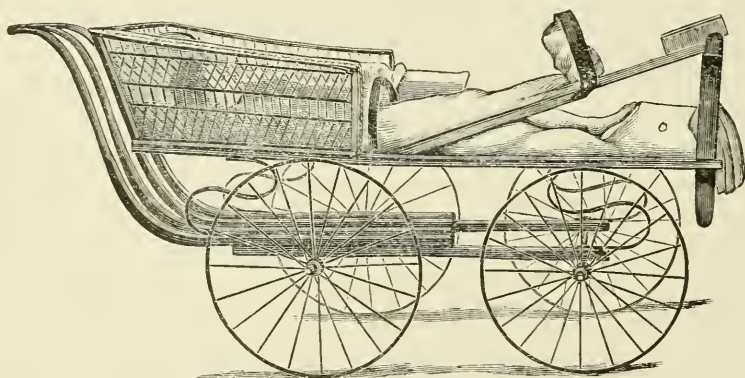
is contrary to all pathological and clinical knowledge of the disease. Practice has sufficiently demonstrated that a solid and almost perfect articulation as regards function may be reproduced after operation. On the other hand, the objection to resection of the hip cannot be explained by the seriousness of the operation, for it is seldom followed by death when practiced according to the rules of modern surgery. Of 48 resections of the hip Volkmann had only 4 deaths; Grosch, from a study of 166 cases, finds that resection practiced at the beginning of the suppuration was attended by no mortality. Lambotte expresses the opinion that the operation can, therefore, only have been abandoned on account of the persistence of suppuration, fistulæ, and the mediocre orthopædic results obtained. He formulates the following conclusions: 1. Conservative measures should be reserved for the first stage of coxalgia. 2. Surgical intervention is indicated as soon as pus forms in the articulation. 3. In non-suppurating coxalgia intervention is indicated if the pain and deformity prove rebellious to treatment by continuous extension. 4. A bloody operation is never contra-indicated by the extent of the local lesions. 5. Disarticulation of the hip should never be practiced at the outset. 6. The best method for total resection is the longitudinal external incision. 7. Vertical division of the trochanter is very useful as the first stage of the resection. 8. In the child the cartilaginous trochanter should always be preserved intact. 9. The danger of resection, when practiced at the beginning of suppuration, is almost *nil*. 10. Resection is the less serious as it is the more radical. 11. In order to insure complete and definite cicatrization all the tuberculous tissue must be extirpated. 12. In suppurating coxalgia resection gives better functional results than the conservative method. 13. Mobile nearthrosis after resection is better than ankylosis. 14. Extensive resections of the acetabulum have no value from an orthopædic point of view. 15. In the child subtrochanteric resection, with preservation of the trochanteric cartilage, gives orthopædic results identical to those of simple cervical section.

W. J. Taylor, of Philadelphia, ⁹⁶_{July, 96} prefers to treat tubercular abscesses in the course of hip-joint disease on true surgical principles,—free incision, thorough curetting of the walls of the abscess-cavity while the wound is being flushed with plain boiled sterile water, and complete closure of the wound in the skin without drainage.

In the paragraph upon Pott's disease (page G-16) allusion was made to the treatment of abscesses by injections of camphorated naphthol. V. Ménard, of Berck-sur-Mer, ³_{Oct 17, 94} also found this

procedure of great value in the treatment of abscesses complicating hip-joint disease. In 40 cases in which the injections were employed 37 were cured without fistulæ as results. In 2 cases the abscess recurred and successful aseptic resection of the hip, without drainage, was performed. The procedure is the same as that already described.

The ischiatic crutch and its place in the treatment of hip disease is considered by V. P. Gibney, of New York. ⁸¹⁴_{Nov. 15, '94} An ischiatic crutch in which the foot-piece was replaced by a ferrule or rubber tip had been shown to the New York Academy of Medicine, and had so favorably impressed the author that he tried it both in hospital and private practice. During the first week both he and his hospital staff were well pleased with the appliance, but he finally was obliged to modify his opinion as to its value. Among



LIGHT CARRIAGE FOR CASES IN WHICH RECUMBENCY IS UNAVOIDABLE. (BREMNER.)
New York Medical Record.

the 20 cases only 2 gained by using the crutch,—1 five degrees, the other fifteen degrees; 13 lost,—that is, became more deformed,—and the treatment was entirely inadequate. In 5, 3 of which were Gibney's personal cases, the crutch served a very good purpose in enabling the patient to walk about comfortably. It was no longer necessary to compress the muscles with adhesive plaster and bandage,—a decided gain, as the muscles had an opportunity of re-developing; it enabled the knee to resume its functions, and altogether proved of advantage in these cases. It would seem, therefore, that the crutch has its use, but only in cases in which a cure has been fairly well established. Gibney does not say that one must wait for the subsidence of all reflex spasm.

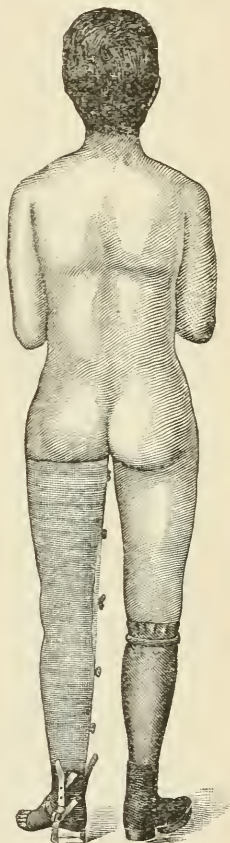
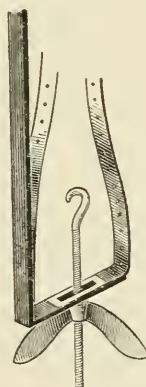
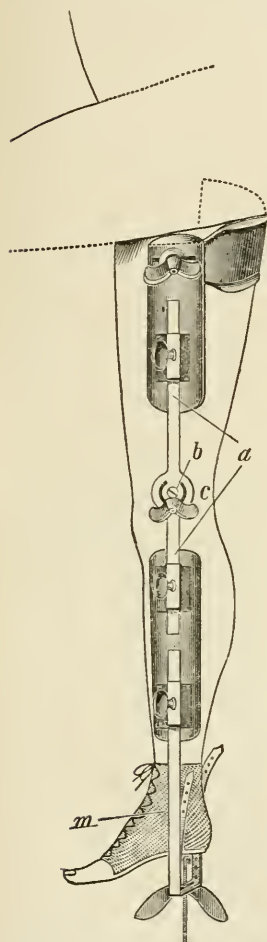
W. W. Bremner, of Toronto, ⁵⁹_{Aug. 3, '95} presents a simple method by which recumbency, with any advantage, can be obtained without the counter-balancing evils which attend it when used

in the general way by confining a patient to bed. A light carriage with wicker-work sides, rubber tires, and well-tempered springs is made of a length suitable for the patient, allowing for at least three years' growth; and it is surprising how a child will grow on such a carriage in the fresh air and sunlight. The cut illustrates

the carriage as used by the author.

[The carriage is most useful as an adjuvant to rest secured by confining the patient in a wire cuirass. Used by itself it makes it very inconvenient to carry the patient upstairs or in railroad-cars, etc.—R. H. S.]

An extension apparatus for the treatment of coxitis, fractures, or severe injuries to the lower



EXTENSION APPARATUS PERMITTING EARLY RETURN TO THE OPEN AIR. (LIERMANN.)
Medical Press and Circular.

extremities permitting an early return to the open air is described by W. Liermann, of Frankfort-on-the-Main. ²²_{Jan. 2 '95} The general conformation will readily be understood by the accompanying illustrations.

The apparatus is placed on the inner side of leg in the form of two iron blades (*a*) connected at the knee-joint by a hinge (*b*)

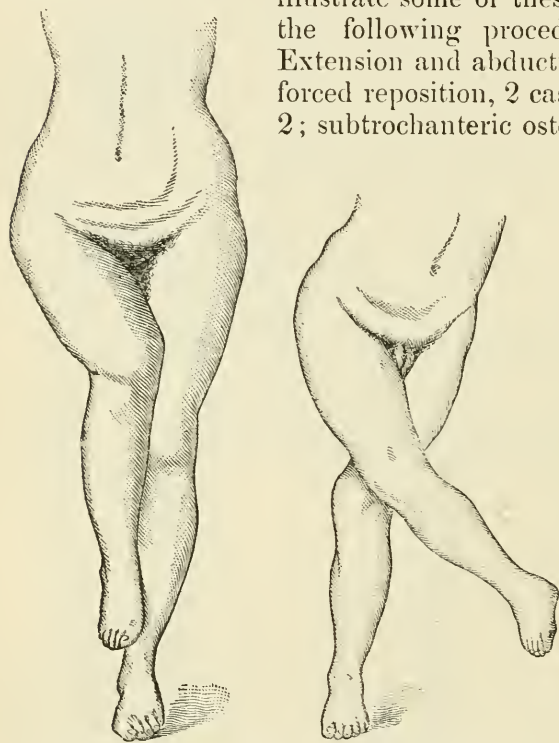
which can be adjusted to any angle by means of the thumb-screw (c).

A combination traction and immobilization hip-joint brace is described by S. L. McCurdy, of Pittsburgh,¹ Nov. 9, '95—a combination of the long traction hip-splint and the Thomas splint.

Subsequent Deformities.—A series of cases of deformity following diseases of the hip, and due to insufficient care during treatment, are recorded by L. H. Petit.¹⁰⁰ Feb. 16, '95

The accompanying cuts illustrate some of these cases, in 19 of which the following procedures were employed: Extension and abduction apparatus, 4 cases; forced reposition, 2 cases; manual osteoclasis, 2; subtrochanteric osteotomy, 8; resection of

the head of the femur, 2; tenotomy of the adductors, with coxo-femoral resection, 1; subcutaneous multiple section of the muscles, 1. In most of the author's personal cases the deformity had followed insufficient treatment of hip disease. A tendency on the part of the adductors to draw the member inward and upward necessitates a continuous resistance, even after the disease has been cured; for, after the lesion of the joint has healed, deformity may be produced if the ankylosis



DEFORMITIES FOLLOWING HIP-JOINT DISEASES DUE TO INSUFFICIENT CARE DURING TREATMENT. (PETIT.)

Gazette des Hôpitaux.

is not complete and the patient walk too soon,—in fact, the pericoxal muscles are atrophied, the capsule is weakened, and the weight of the body on the diseased member causes a sort of subluxation of the joint, which can only tend to increase.

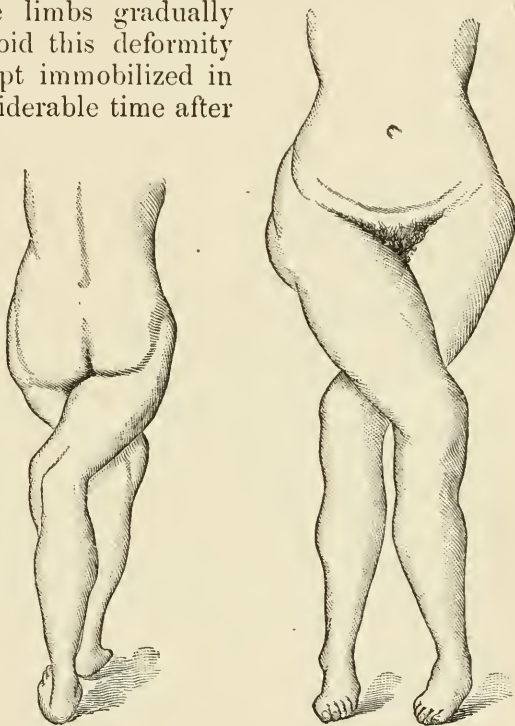
[When a diseased joint is cured it requires no protection. If it still has muscular spasm and if deformity and stiffness increase on exercise, the joint is not cured. The tendency is to abandon the use of apparatus too soon and to pronounce a case "cured" as

soon as acute symptoms subside and the patient can be handled rather roughly without causing immediate pain. This is often on account of the involuntary protection which the patient's muscles afford the joint by preventing it from motion, and the "cure" is only beginning instead of being complete.—R. H. S.]

If crutches are then used, the inconvenience experienced during walking leads the patient little by little to place the infirm limb in front of the sound one in order to support it in a way, and, the same attitude being assumed in bed, the crossing of the limbs gradually becomes effected. To avoid this deformity the member should be kept immobilized in a good position for a considerable time after recovery. This is the formula which Petit learned about twenty-five years ago from his master, the late Verneuil.

A. B. Judson, of New York, ⁸¹⁴_{Jan. 1, '95} re-affirms his conviction of the value of "symmetrical walking" in the prevention and correction of the adduction so common after hip disease. By "symmetrical walking" the author means walking in the normal rhythm, resting the weight of the body as long on one leg as on the other. He advocates careful drill in this method

of walking until it becomes a permanent habit. Hoffa ⁶⁹_{Sept. 26, '95} has devised a new method for the treatment of deformities resulting from hip-joint disease to which he has given the name of "oblique subtrochanteric osteotomy." He begins by separating the muscles and tendons from the trochanter to the external side of the femur, and then with a chisel severs the bone in an oblique direction. The limb is then extended so that the lower portion of the bone slides down along the upper portion, both



DEFORMITIES FOLLOWING HIP JOINT DISEASES DUE TO INSUFFICIENT CARE DURING TREATMENT. (PETIT.)

Gazette des Hôpitaux.

osseous surfaces being maintained in contact. If the resistance of the muscles is too strong, tenotomy must be performed before applying the extension.

Pseudo-hip-joint Disease.

In a valuable clinical lecture at the Hôtel-Dieu, Paris, S. Duplay ³_{Dec. 18, '96} divides pseudocoxalgia into two principal classes. In the first he ranges cases in which the coxo-femoral articulation is healthy or in which a lesion exists in its neighborhood. In the second class he places the more interesting form, in which not only is the joint itself intact, but in which there is no lesion in the more or less immediate vicinity. Cases in the first group differ essentially, but most frequently there is some inflammation of the bony structure, either of the pelvis or the upper end of the femur, and principally at the level of the great trochanter. In other cases there is an inflammation of the bursa serosa in the neighborhood of the joint. In the case forming the text of his lecture the bursa serosa of the psoas was the part involved. Finally, neoplasms of the pelvis or of the upper extremity of the femur may produce symptoms simulating coxalgia, as in a case cited by the speaker in which an hydatid cyst of the femur was mistaken for coxalgia. Various periarticular affections give rise to reflex contractions, especially of the pelvi-trochanteric muscles, which cause the patient to assume vicious attitudes that may lead one to suspect the existence of coxalgia. It is only by the attentive study of the minutest details that an error in diagnosis can be avoided. When there is any doubt entertained the patient should be anæsthetized and, when muscular resolution is obtained, if the articulation is healthy it can be moved in every direction without causing the least friction.

[This is true, but it is also true that tuberculosis of the hip-joint begins very frequently in the femur and does not involve the cartilage and synovial membrane of the joint until later. In these cases perfectly free motion of the hip can be obtained under complete anæsthesia and there is no friction in the joint. It would be a vital error, however, to treat such a case as not being hip-joint disease. By anæsthesia we abandon the aid of the involuntary muscular spasm, which is of prime importance in making an early diagnosis of a joint inflammation wherever situated, and on the promptness with which such inflammation is recognized and rest applied depends the chances for perfect recovery.—R. H. S.]

In regard to the second class of cases, Brodie, in 1837, was the first to call attention to these under the names of spasmodic coxalgia and articular neuralgia. These terms have been generally

replaced by that of hysterical coxalgia. Verneuil and Charcot have made a very complete study of this singular form of pseudocoxalgia. It is usually met with in women, though some cases in men have been recorded. It may be observed at any age, though principally in youth, and often at the period of puberty. It is sudden in onset, from some insignificant cause, and occurs in persons whose antecedents had some nervous disorder or who themselves show marked evidences of hysteria. In certain instances the onset coincides with some slight injury or great effort. The principal symptoms are pain, muscular contractures, and the resulting vicious attitudes. Cutaneous hyperæsthesia may also be present, causing true nervous attacks whenever the skin is touched. Pain on pressure also shows special characteristics. In coxo-tuberculosis it is deep rather than superficial, while the reverse is the case in hysterical coxalgia; for, as Brodie remarked, much more pain is caused by pinching the skin than by exercising deep pressure. Another peculiar feature is the resistance of the contractures. In coxo-tuberculosis, especially in the beginning, these can be overcome, to a degree, by patience, and slight movements of the joint can be effected, but in the hysterical form this is never possible. If, in spite of these distinctive signs, the diagnosis remain doubtful, the integrity of the articulation can readily be ascertained under narcosis.

The prognosis, as a rule, is favorable, hysterical coxalgia being a benign affection, always recovering, and sometimes suddenly, and it is in this manner that attempts should be made to cure it, all violent measures being avoided.

Larroussinie, of Castel-d'Andorte ¹⁸⁸_{July 21, '95} describes a case of hysterical coxalgia with infantile paralysis and mental disturbances in an hysterical patient. The history of the case shows, however, that the man had suffered from gonorrhœal arthritis. A good review of the subject of hysterical coxalgia is given by P. Faitout. ⁹⁹⁶_{Oct. 25, '95}

Coxa Vara.

Under the title of coxa vara, a professional disease of growth, Th. Kocher, ³⁰¹_{B. 33, H. 6} makes a valuable contribution to an affection as yet but little known and bearing a great resemblance to the genu valgum and pes valgus of adolescence. (See ANNUAL, 1895, vol. iii, G-1.) Two cases observed by the author were young men of 18 years, thin and tall, but of strong constitution and excellent general health. One of them was a workman in the country and the other was employed in carrying large cans of milk, being obliged to walk carefully, with the feet well turned outward. It can easily be understood that, under such conditions, deformity and deviation of the neck of the femur may occur in the event of

any circulatory disturbance or too great proliferation at the epiphyseal line, leading to softening and diminished resistance in this part of the skeleton. The weight of the body bearing on the head of the femur depresses the latter below the horizontal line passing at the top of the great trochanter, while the weight of the body, acting in the position of extension and rotation outside of the limb, tends to bring about an incurvation of the neck of the femur backward. The stretched ileo-femoral ligament maintains the extension or hyperextension in a passive way, without fatigue for the extensor muscles; but if, in order to produce energetic external rotation of the member, the retrotrochanteric rotator muscles are frequently or continuously brought into play, it is evident that this muscular action may, little by little, determine deviation backward of the femur.

What was peculiarly characteristic in Kocher's cases was the lengthening of the femur, indicating an exaggerated growth at the upper epiphyseal line; this lengthening was analogous to that of the internal condyle in genu valgum. On the other hand, the position of the head of the femur, the most convex portion of which was directed downward and backward, was also characteristic. The soft and bony parts of the articulation showed none of the alterations of arthritis deformans. The cartilage, it is true, was much thinner and wrinkled, as if its surface had become too large in proportion to that of the adjacent softened and atrophied bone surface; but this alteration was secondary, and occurred at points where the cartilage at the head of the femur was no longer compressed by the cartilage of the articular cavity. The cause of the deformity described under the name of coxa vara must, therefore, be sought for in a disease of the bones manifesting itself, on the one hand, by softening and, on the other hand, by abnormal lengthening of the neck of the femur. This affection, the nature of which is as yet obscure, is the consequence of functional excess and resulting disturbance in the circulation.

It is a disease of youth, occurring in tall, slender individuals, with slightly-developed muscles, who are obliged to perform work requiring exaggerated effort on the part of the coxo-femoral articulations. The progress of the disease is simple, but rapid. The patient is first attracted by pains, especially intense at the beginning and disappearing completely as soon as the deformity declares itself. These pains are localized in the hip, with irradiations into the buttock and knee. Stiffness of the joints develops, becoming more and more marked, with rotation of the foot outward, until finally the patient can no longer bend forward or sit down comfortably. In from eight to twelve months from the onset the func-

tional disturbances may reach such a stage as to render surgical intervention necessary.

As regards the symptomatology, the walk of the patient is what first attracts attention; the pelvis is elevated on the side on which a step is to be made, and the corresponding leg advanced by describing a half-circle. A characteristic balancing motion of the body is due to the impossibility of flexing the thigh on the pelvis. The patient also places one leg before the other by adduction, as in spasmodic spinal paralysis, except that in the latter disease there is flexion of the hip and knee. In the dorsal decubitus the marked rotation outward strikes the observer, while in complete extension the limbs are parallel to each other. It is then seen that flexion at the hip is limited, as well as abduction and rotation inward. Palpation reveals only elevation of the great trochanter, the external surface of which tends backward.

The affection progresses regularly unless recognized at an early stage and treated by complete repose in a good position. Once the deformity is produced, the only efficacious measures are osteotomy or resection. Kocher practiced resection in his cases on account of the great stiffness, operating first on one side, then on the other, cutting the bone below the great trochanter. He was able to observe the ultimate result in only one of his patients, movement being free and painless, and the patient being able to walk a long time without a support and without experiencing fatigue. There was, however, a slight lameness, sometimes on one side, sometimes on the other, which the patient attributed to weakness of the muscles.

Schnitzler presented a case of coxa vara to the Vienna Medical Society, ⁵⁷ Nov. 18, '04 the patient being a young man, 18 years old, who had begun to limp some three months previously and to experience pain in the left hip and knee. There was a shortening of 2.5 centimetres of the left leg from the spine of the ilium to the malleolus. The distance between the latter and the trochanter was the same on both sides. The movements of flexion and extension were free, but those of abduction and adduction were limited. Coxalgia, dislocation, etc., could be excluded, and the case was rather one of flexion of the neck of the femur, which made a right angle with the bone. Late rachitis might be admitted in the etiology of the condition. Treatment consisted in extension, but subtrochanteric osteotomy was not to be recommended. Albert, in the discussion, remarked that the condition is a frequent one, and often confounded with arthritis. Cases of coxalgia followed by recovery in young persons belonged to this category. Hochenegg observed that bending of the neck of the

femur was frequent in genu valgum and varum, where it might be regarded as a sort of compensation.

J. Leusser, of M \ddot{u} nnerstadt,³⁴ July 30, '95; Nov. 2¹ gives a detailed account of his observations in coxa vara, which is, according to him, much more frequent than is generally supposed. From an etiological point of view rachitis, first of all, should be considered as a factor in this affection, although it is especially frequent at the age of from 13 to 18 years. It is constantly found among the antecedents of patients, or, more frequently still, the marks of former attacks of rachitis are found in the patients themselves. There may be in some cases tardy symptoms of rachitis,—that is, the manifestations do not reveal themselves during infancy, but develop about the age of puberty. Finally, there are other cases in which it may be a question of an isolated localized rachitis, as in certain cases of genu valgum. Lauenstein has cited a case in which the deformed neck of the femur presented the characteristic lesions of rachitis.

A case of bending of the femoral neck in a youth of 17 has been reported by B. F. Curtis.⁸¹⁴ Nov. 1, '94 Pain in the knee had been noticed fifteen months before, and shortening of the limb, limping, and pain and stiffness at the hip had been observed for a month or two. Examination showed no marks of rachitis. The limb was atrophied, slightly flexed, adducted, and considerably everted; the trochanter was prominent and about an inch above N \acute{e} laton's line. The motions at the hip-joint were mostly limited; abduction and internal rotation nearly lost. Shortening, an inch and one-half. The diagnosis of arthritis seemed probable, and the hip-joint was opened as an exploratory measure. The joint was found healthy, but the neck of the femur was shortened and bent downward.

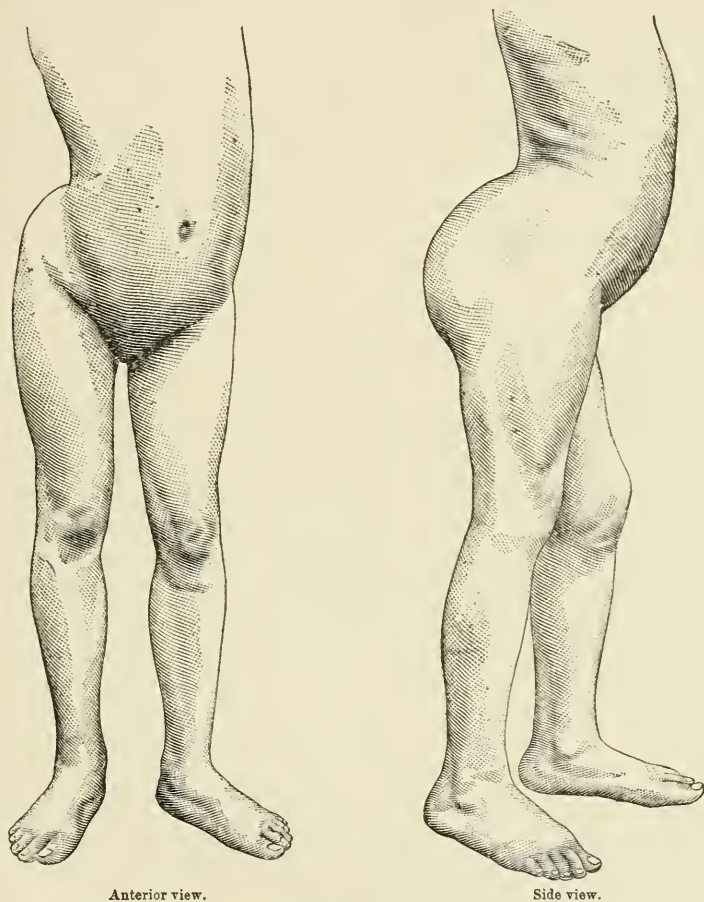
Curtis quotes Hofmeister⁷⁶¹ B 12, '94 as reporting forty cases and stating that at the T \ddot{u} bingen clinic he had found nearly half as many cases of this deformity as of knock-knee.

Kirmisson, according to Myers,³²¹ Sept., '94 believes that the abnormal flexion of the femoral neck is due in some cases to a previous coxitis, osteomyelitis, or epiphyseal separation. The other cases may be associated with genu valgum and flat-foot, and may be rachitic, or the deformity at the femoral neck may be the only symptom. The affection seems to be quite rare, considering the frequency of rickets.

Congenital Dislocation of the Hip.

W. B. Hopkins, of Philadelphia,⁴⁵¹ July, '95 describes as follows the case of a very healthy, well-nourished, Italian girl, aged 12 years: "Examination of the hips reveals the presence of both femoral heads

upon the *dorsa ilia* firmly set in new sockets. These sockets, while allowing a freedom of motion of the heads almost entirely normal, hold the latter so firmly in place that they yield but little to forcible traction downward and forward, none upward and backward; there is very marked lordosis, the knees are slightly knocked, and the toes normally turned out. The deformity being bilateral,



Anterior view.

Side view.

CONGENITAL LUXATION OF THE HIPS. (HOPKINS.)

International Medical Magazine.

the shortening of the thighs is, of course, uniform, and by referring to the cuts it will be seen that the thighs are relatively shorter than the legs. The girl's gait, though characteristic of the condition, is good; she can walk fast, run, climb, and jump from heights of three or four feet with ease. She has no pain in the hips or back. In view of her excellent health, the comparatively perfect condition of the new hip-joints, the good gait, and the

freedom from pain, no treatment has been for the present employed, but the case will be kept under careful observation."

James P. Warbasse, of Brooklyn, ⁹⁶_{Mar., '96} gives an interesting *résumé* of congenital dislocations of the hip-joint treated by Schede, ²⁰⁶¹_{'94} who has, since 1880, treated twenty-nine congenital luxations of the hip by non-operative (orthopædic) methods. His method rests upon the fact that in the majority of children with congenital hip luxations, in whom no secondary changes have been caused by walking, a simple traction upon the leg and a slight abduction suffice to place the head in the acetabulum, and that, further, a moderate lateral pressure upon the great trochanter is all that is necessary to retain the head of the bone in its position. After the child has begun to walk the prognosis is less favorable. By the end of the second year, certainly in the third, changes have become so marked that simple manual extension no longer suffices to reduce the deformity. But in such cases continuous extension by means of weights for a few weeks or months so restores the positions that, with abduction and pressure over the trochanter, the head of the bone may be made to go back in its place and remain so firmly fixed that pressure upon the sole of the foot no longer causes it to ride out. In order to combine the lateral pressure over the trochanter with extension, Schede has had constructed a splint apparatus. This splint should be worn till a cure is effected, and a duplicate splint should be kept on hand for contingencies. At night moderate extension of four or five pounds is kept up by air-pillow leg-girt.

The ages ranged as follows: One of 11 months, four under 18 months, eleven from 17 months to 4 years, sixteen from 2 to 5 years, seven from 3 to 7 years, four from 8 to 10 years. Of the cases treated by Schede, it will be seen, therefore, that a large proportion were under 5 years of age, and that his method would not be applicable to a case where growth and development have so adapted themselves to the abnormal arrangement of parts as in the case described by Hopkins.

Hoffa ⁴⁷⁵_{June, '95} ²_{July 18} reports the results of his operation for congenital dislocation of the hip, which consists in exposing the joint, deepening the cotyloid cavity, and placing the head of the femur in its normal position. He gives the results of 112 operations performed on 82 patients, 30 of which were affected with bilateral and the remaining 53 with unilateral dislocation. In 3 of these cases death occurred as a direct result of the operative treatment, having been due in 2 cases to prolonged anæsthesia with hæmorrhage and shock, and in the third instance to iodoform poisoning. These disasters led the author in subsequent operations to perform

the operation more rapidly in order to avoid chilling of the patient, to refrain, as far as possible, from division of muscles, and to substitute simple sterilized gauze for iodoform dressings. In 9 cases the operation was followed by ankylosis of the affected hip, attributed in 8 of these instances to suppuration in the wound. In the remaining cases of recovery, in which the treatment resulted in the establishment of a freely movable joint, there was no subsequent tendency to stiffness of the hip either from adhesions or from muscular contraction. In most cases, it is stated, the mobility of the limb increased steadily after the discharge of the patients from the hospital. Return of the luxation was noted in 11 cases; in 3 the bone was displaced backward and in 8 forward. In the cases of backward displacement the patients had been removed from the author's supervision before the completion of the treatment. The forward displacement he attributes to insufficient deepening of the cotyloid cavity, and occurred in his early cases. In instances of unilateral dislocation the operation is followed by decided lengthening of the affected limb in consequence of the restoration of the head of the femur to its normal level. The amount of persistent shortening due to deformity of the neck of the displaced bone is not very great, and may be obviated by obliquity of the pelvis and by the use on the affected side of a boot with a thicker sole. In cases of bilateral dislocation the author states that his operation results in a removal of lordosis, in a reduction to a minimum of the waddling gait, in restoration of the normal direction of the limbs, and in increased abduction mobility. It is asserted that in all cases of successful operative treatment by this method the improvement persists steadily from the period of convalescence and increases from year to year.

The best possible operation in cases of congenital dislocation of the hip is one which will enable the surgeon to effect complete reduction of the displaced head of the femur and to establish a movable joint. The author insists on the necessity of preserving the continuity of the muscles of the joint and of restoring their healthy condition and contractile vigor. In recent modifications of his operation he refrains as far as possible from cutting the contracted muscles, and in his after-treatment he attaches great importance to electricity and massage.

According to Warbasse ⁹⁶ it has been Lorenz's endeavor, ⁴⁰⁴ during the last two and a half years, to do away as much as possible with the division of muscles in the one hundred and forty cases in which such operation might have been practiced, and finally he has arrived at his present method of reduction, which is

characterized by the absolute preservation of the continuity of the muscles. Lorenz divides the cases into three classes:—

1. Those in which the head of the femur can be easily brought down into the acetabulum in children from 3 to 5 years of age. In these cases an assistant grasps the dislocated leg above the knee and makes moderate extension with the leg slightly abducted without any contra-extension against the perineum. An incision six to eight centimetres long is carried from the antero-superior spine of the ilium along the outer border of the tensor fasciæ muscle downward and outward. The fascia lata is divided from the spine downward along the outer border of the tensor fasciæ muscle, backward along the anterior border of the glutæus medius muscle, and the tensor fasciæ latæ, with the overlying sartorius and the underlying rectus cruris, are drawn forward. The anterior capsule of the joint is then exposed by blunt dissection. The transverse separation of the fascia lata from the wound outward allows the head to be brought down by moderately strong extension. The capsule is then divided, the acetabulum gouged out, and the head reposit. This is practically what is done also in the more severe cases. In this operation the head is reduced into its normal place without cutting a single muscle about the hip-joint.

2. In cases of moderate severity in children from 6 to 8 years, in which the ordinary methods of extension do not bring the head down into place, the same principle of preservation of the muscles is to be observed. The anterior capsule is exposed in the same manner as above described. As an aid to reduction Lorenz uses, in this class of cases, a band thrown around the leg, upon which two assistants make extension in a slightly abducted direction, while counter-extension is made by a perineal band. The capsule is then opened and the head drawn down to its normal level. Lorenz uses, in especially difficult cases, a screw arrangement at the foot of the table around which the extension bandage is passed, and traction is made by gradually winding up the bandage which is fixed about the leg. In using such an apparatus it is important that the extension be made very gradually. By this means it is possible to accomplish reposition in severe cases without dividing a muscle.

3. In severe cases, between 9 and 12 years and upward, with marked shortening and very slight downward movability of the head, it is necessary to precede the operation by a period of treatment with extension. This may be accomplished by an extension of thirty pounds for not more than fourteen days. The effect of this is often not very evident, and the chief work has to be done at

the time of operation with the extension screw. Lorenz has been able to manage the most difficult cases in this manner without sacrificing a muscle. As soon as reduction is accomplished the capsule is opened by a liberal cross-incision. One arm of the cross reaches from the spina ilia anterior inferior to about the middle of the linea intertrochanterica anterior, and corresponds with the direction of the neck of the femur. The other arm of the cross is nearly at right angles to the first and extends from the region of the front inner border of the rudimentary acetabulum to above the level of the upper part of the head of the femur. The ligamentum teres should be extirpated. The opening of the joint is followed by gouging out the acetabulum. In order to render the acetabulum more accessible the head is lifted out of the way by slight flexion, abduction, and elevation of the femur, while the anterior muscles (tensor, sartorius, rectus, and ilio-psoas) are strongly retracted inward by a blunt retractor. Through this opening the rudimentary acetabulum is reached by the index finger, along which a sharp spoon is guided, and the cartilaginous floor of the same is scraped out. The *modus procedendi*, of course, varies with the case, but the idea is to make as deep and normally shaped an excavation as possible to receive and retain the dislocated head. Herein lies the art and the difficulty of the whole operation. Great pains must be taken to make a good excavation and a sharp upper border to the same. As the act of cutting out the acetabulum is a very bloody operation, it is advised, when both sides are operated upon at one sitting, to make the operation as rapidly as possible. A perforation of the wall of the pelvis in making the acetabulum is, as a rule, entirely unnecessary. When a satisfactory acetabulum has been made, the last act of the operation follows,—namely, the reposition of the head of the femur into the artificial acetabulum. When it has been found beforehand that the head can be brought down to the proper level, there is usually no difficulty encountered in fitting it into the new cavity by simple extension, provided that no tissue falls between to prevent reduction. As a rule, it is necessary to make some little improvements in the acetabulum after testing the fit of the head in it, until the head fits firmly in its new cavity. The operation may be regarded as satisfactory when the bone remains in place with the leg lying out straight, or when it is slightly adducted. The capsule should be brought together, but not sewed. The skin wound, with the exception of a small central point, is then closed with sutures. An aseptic dressing is applied and the leg is fixed in a position of light abduction by a plaster bandage extending from the axilla to the malleoli. In the case of young children

Lorenz has completed the entire operation in from ten to fifteen minutes. Double-sided luxations in young children from 4 to 5 years of age he corrects at one sitting. The plaster bandage in such cases is made to include both legs, which are lightly abducted. The after-treatment consists in the absolute rest of the muscles and joint. On the fifth or sixth day the children are usually allowed out of bed. An elevation can be placed under the sound foot. On the tenth day the dressing is renewed. In the course of the fourth week the entire fixation bandage is removed, and the wound, which should be nothing more than a superficial granulation, is simply protected with a gauze bandage. Gymnastics and massage of the leg are then begun. The gymnastics consist in very careful and slight passive flexion, extension, and abduction of the leg, and their combinations. The movements of abduction and the massage of the muscles of the buttock are of the greatest importance. When it is seen how quickly these children regain the use of their legs, the value of preserving the muscles is very evident. In the sixth week the patient is, as a rule, able to walk alone or with the assistance of another. Lorenz has entirely given up every sort of apparatus for after-treatment.

Mickulicz²²⁶_{B.49, II.2} states that operations such as those of Hoffa and Lorenz are grave in themselves, and are apt to increase the disablement of the patient. The head and neck of the femur are usually of normal shape and direction to begin with, but the capsule is slack, and with the weight of the body when the child has begun to walk the dislocation increases. The best results will, therefore, be obtained in children who come under treatment before they have learned to walk. Supposing that the head can be brought into contact with the acetabulum, the object of treatment will be to keep it there. This is best done by (1) traction, (2) abduction, and (3) outward rotation of the limb. This Mickulicz effects by means (1) of a splint, or double trough, in which the child lies for a portion of the day, and (2) by the use of a felt corset, which the child wears at other times, coming down over the ilia and preventing the upward excursions of the head and trochanter. Treatment, having been begun under the eye of the surgeon, is carried on for months, or even years, at home by the mother. Mickulicz reports five cases, in three of which complete recovery may be claimed, and whose ages at commencement of treatment were 10 months, $3\frac{1}{2}$ years, and $4\frac{1}{2}$ years. The treatment lasted 17 months, 18 months, and 12 months, respectively.

H. G. Davis, of Everett, Mass.,⁹⁹_{Nov.22, '94} calls attention to some facts that he had published some years since,—namely, that all of the soft parts can be elongated to any extent necessary by con-

tinued, uninterrupted extension, including the capsular ligament. This result cannot be secured by fixing the limb, but it must be by a *constant* tension of the parts that it is designed to elongate. Where this process has been adopted he has never known it to fail of elongating the surroundings of a joint sufficiently to bring the limb into its place without any force.

The principle is to weary the muscles by an unremitting pulling. His heaviest weight was only 7 or 8 pounds. In young children very much less was needed,—say, 3 pounds. This result appears philosophical when we consider that the new material is received by the parts in a liquid state, and when organized cannot be as tense as the old tissues.

[The editor cannot understand this.—R. II. S.]

Then it can be ascertained if the head of the bone is in the acetabulum by carrying the femur up. If it is in its place, the trochanter will be thrown out from the body; the depth of the rim of the acetabulum and the condition of the latter can be well ascertained, particularly if it is filled up. The limbs should be kept in this position until the parts about the joint have all become conformed to their position. He describes an interesting case in point.

[Sometimes the head of the femur appears to have been replaced in the acetabulum when really it is far from it, as the editor has seen by cutting down on such a joint which gave the impression of being in its proper place before incision.—R. H. S.]

C. G. Foster, of Cambridge, Mass., ⁹⁹_{Nov. 29, '94} regards Davis's statement as perfectly correct; but the natural inference therefrom—namely, that therefore no operation or other treatment is necessary—is misleading. In such a case the difficulty is not to get the head of the femur into proper position, but to keep it there. And the key-note of the case is the fact that nature has failed to provide the usual means of keeping it there.

Gibney, of New York, ⁹⁶_{Aug., Dec., '94} reports unfavorably on operation for traumatic dislocation of the hip. In double dislocation patients, as a rule, learn to balance themselves and walk with a swinging gait comfortably. Pain, however, may come into play suddenly and comparatively late in life. The operation is a severe one, and the result is apt to be a stiff joint with limb in convenient position. Corsets may be of advantage in some cases in giving some degree of comfort. They must not be expected to be curative.

Ankylosis of Hip-joint.

In connection with a case of complete ankylosis of the lower extremities in a little girl, Villar, of Bordeaux, ¹⁴_{Aug. 28, '95} discusses the

pathogeny. According to the parents, the child had always been in the same state. Medullary compression might be suspected, as there was a bony tumor at the level of the lumbar cord which might bear some relation to the malformations of the lower limbs.

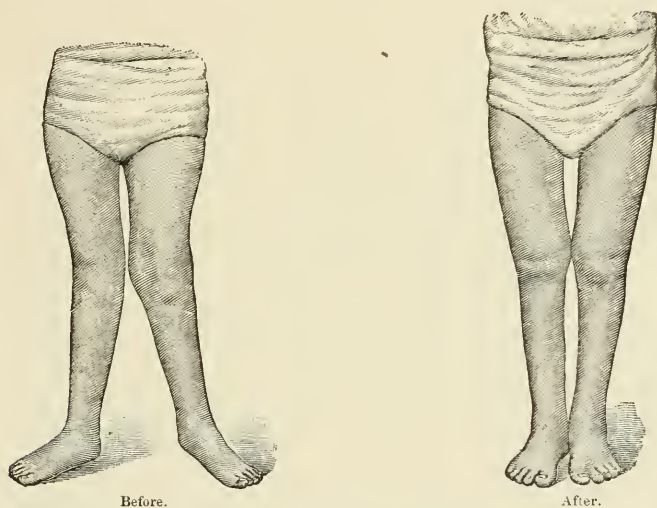
Le Dentu, of Paris, ³_{Oct. 17, '94;} ⁶⁷³_{Dec.} in a paper upon subtrochanteric osteotomy of the femur for vicious ankylosis, states that manual reposition, with multiple subcutaneous myotomy, could be performed in cases dating back eighteen months or two years in which the deviation did not exceed twenty to thirty degrees. In older and more marked cases of thirty to thirty-five degrees, manual or instrumental osteoclasis, with multiple myotomy, would perhaps be better. In still more marked cases of deformity, linear resection or cuneiform excision is usually necessary, the latter being preferable on account of the greater facility with which the surfaces can be approximated, the fragments being more movable with linear section. Personally he prefers cuneiform osteotomy, and to avoid any danger of a sphacelus he does not hesitate to excise a transverse cuneiform slice of the adipose tissue and the skin behind the solution of continuity in the bone. If, in suturing, he observe anæmia of the soft parts, from approximation, he uses a large T-shaped wire splint, the vertical branch of which is at an obtuse angle with the transverse branch. He makes moderate abduction of the member, the foot being rotated outward, and in a few days he substitutes for the splint a simple apparatus for continuous extension, counter-extension being made on the buttock of the other side. A tension of 2 to 4 kilogrammes (4 to 8 pounds) is sufficient. To prevent stiffness of the knee he believes that passive movements should be employed from the fifteenth day, care being taken not to extend the motion to the hip-joint. If it is desirable to obtain nearthrosis, mobilization should not be attempted before fifteen or twenty days after the operation.

Ankylosis of Knee-joint.

Ahrens ⁷⁶¹_{B. 14, H. 1;} ²_{Nov. 23, '95} reports a case of fatal fat-embolism after forcible straightening of both knee-joints. A woman, aged 53, had ankylosis of both knee-joints in a right-angle position. This was to a great extent corrected by continuous extension. Afterward, under ether, they were completely straightened, very little force being used. Two days later the patient became drowsy and died the next day. At post-mortem an extensive fat-embolism of the lungs was found. On the ends of the bones forming the joints, which were in a state of advanced osteoporosis, there were recent crushes and depressions. Two cases have been reported from Halle and Marburg. It follows that this proceeding is not

so devoid of danger as is supposed. It is suitable only for recent cases, where but little force is necessary (these usually yield to extension), and is altogether contra-indicated in chronic cases, where one must suspect fatty degeneration of the bones or muscles.

Bradford, of Boston, ⁵⁹ June 8, '95 showed to the American Surgical Association photographs of the knees of a man of 60 years, who in youth had had suppurative inflammation of one knee-joint, which got well under treatment after a long time, but left what was regarded by his surgeon as irremediable stiffness of the knee. The patient, disregarding medical advice, devised an apparatus consisting of a weight and a rope. The latter was also attached to his ankle, and by long-persistent exercises daily the stiffness



MODIFICATION OF MACCORMAC'S OPERATION. (GRAVES.)

Medical News.

was overcome and perfect motion restored. This knee is now as good as the other. The exhibitor thought the case instructive.

A case of excision of both knees for angular ankylosis is recorded by G. P. Newbolt, of Liverpool. ⁶ Nov. 24, '95

Genu Valgum.

In a paper on genu valgum, Schuyler C. Graves, of Grand Rapids, Mich., ⁹ Sept. 21, '95 considers the Macewen and MacCormac operation. Although the Macewen is recommended to-day by almost, if not quite, all of the text-books as superior to the MacCormac, it is, in his opinion, inferior to the latter, or, rather, to the modified MacCormac. In the Macewen operation the incision is made vertically on the *inner* aspect of the thigh, and the bone divided

“at a point where the two following lines meet: one drawn transversely a finger's breadth above the external condyle, and a longitudinal one drawn one-half an inch in front of the adductor magnus tendon.” In the MacCormac operation the incision is made transversely on the *outer* aspect of the thigh, at a point about two inches above the lower femoral epiphysis.

In an osteotomy for genu valgum, on a boy of 5, that Graves performed, the MacCormac operation with some original modifications was chosen. These modifications were the following: (1) a change of incision from the transverse to the vertical direction and (2) an incomplete section of the bone with the production of a “green-stick” fracture in the portion undivided. The results of the procedure are shown in the cuts on preceding page.

Genu Recurvatum.

Campenon¹⁰⁸_{Dec.1,'95} notes the frequency of genu recurvatum and lateral movements in different diseases of the hip which have required prolonged rest in bed and immobilization. Phocas¹⁰⁸_{Dec.1,'96} has observed similar conditions in patients suffering from equinus, tumor albus of the ankle, or paralysis of the lower limb. These cases are explained by the influence of youth, traction, and especially hyperextension and muscular atrophy. The prophylaxis would thus evidently consist in seeing that traction of the hip is properly applied, that the knee is not kept in a position of hyperextension, and that electricity is used at an early stage.

Newbolt²⁶_{Nov.1,'95} showed a case in which the birth was normal,—*i.e.*, in the head position,—although, he believed, it was stated by some authors that a breech presentation was the usual rule. On examination the knees were found to be considerably hyperextended, so that it was difficult to make out the patellæ, and the condyles of the femur were very prominent behind, so that the apex of the knee was behind instead of in front. The skin in front of the knee was much folded, and it was impossible, without using a good deal of force, to flex the knee at all. By forcible traction and flexion at intervals of about two days, combined with an anterior splint, the angle of which was altered every other day, the limb was already got into an improved position.

Talipes Equino-varus.

Pathology.—Kirrison and Charpentier, of Paris,⁸⁵³_{July,'95} state that exaggerated obliquity of the neck of the astragalus upon the body of the bone constitutes the chief lesion in equino-varus, as pointed out by Parker and Shattuck, of London,²⁰⁸²_{'97} and Scudder, of Boston.⁹⁹_{Oct.27,'97} The method of mensuration adopted by these

authors, however, seems somewhat irrational, when the exterior configuration of the astragalus is considered, together with the slightly oblique direction of the head and neck in relation to the body of the bone. It is surprising to Kirrison and Charpentier to read that the obliquity of the neck to the body is measured by an angle of 10, 30, or 40 degrees. These are acute angles, and seem to them not to correspond with the slight degree of obliquity. The figures can only be explained by reading the method of mensuration employed by Parker. Kirrison and Charpentier regard it as preferable to measure the angle formed by the axis of the neck itself with the axis of the body. To measure in this manner they traverse the astragalus, with the aid of a needle directed vertically, to the union of the body with the neck; then, using a needle-holder, they implant upon its horizontal branch the needle itself, in such a way that this horizontal branch is made to assume the axis itself of the body of the astragalus. As to the axis of the neck, it is obtained by a movable thread around the central point representing the union of the body and the neck. By proceeding in this manner they obtained the following results in twelve specimens of congenital equino-varus in their laboratory: The average of the preceding figures gives, for the angle formed by the axis of the body and neck, 137 degrees, and for the complementary angle 43 degrees. Parker, by his method, had found an angle varying from 49.6 to 64 degrees, and Scudder 50.30 degrees. The same mensurations in case of talus valgus of congenital origin gave Kirrison and Charpentier 150 degrees for the right foot and 140 degrees for the left.

The anatomy of equino-varus is well considered by Louis Lapeyre, ²⁰⁰⁰_{No. 572, '95} who finds that the primary condition is incomplete progressive dislocation of the various joints of the foot, the bony deformity being entirely secondary to the arrested development or increased growth of the parts, brought about by the crowding together of the bones on the plantar and internal surface and their separation on the dorsal and external surface. From an anatomical stand-point, two new facts are brought out by the author: (1) the hypertrophy of the dorsal ligaments, especially the external dorsal, and atrophy of the plantar ligaments; (2) the weakness of the scaphoid insertion of the muscles of the legs. These two points are demonstrated by the constant invariable presence of bony lesions in congenital club-foot and the existence of bony obstacles to reduction, which cannot be overcome after eight or ten years, but which may, on the other hand, be arrested in development in the infant. Surgical intervention must, therefore, be complex and take in the various bones.

Treatment.—P. Redard⁵⁵_{Dec. 1, '94} agrees with Wilson²⁰⁸³_{'92} and most orthopædists as to the necessity of intervention at the earliest possible moment in congenital club-foot, and advises operation in the first days after birth. In a case of left equino-varus the operator places his left hand in such a way that the projecting part of the back of the foot is supported by the middle of the hand a little below the thumb, which presses against the lower extremity of the tibia and keeps the astragalus firm while the fingers surround the lower part of the leg, as in the cut. This hand must carefully include the exact extremity of the leg, a little below the malleoli, so as to avoid any movement of separation or diastasis at this point. The fore-foot is then seized by the left hand, the concavity forming a sort of groove, the thumb being placed above or below the fore-foot (Fig. 1). The hands being thus placed, a movement is made by which the left hand pushes the fore-foot firmly, causing it to

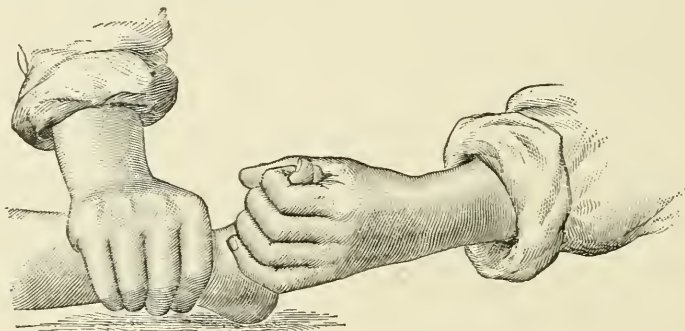


FIG. 1.—EQUINO-VARUS. (REDARD.)

Gazette Médicale de Paris.

rotate on the head of the astragalus, at the same time pushing it upward and outward, while the thumb and the palm of the right hand bear strongly upon the convexity of the back of the foot, the last two fingers upon the internal part of the calcaneum, pushing it at the same time downward and outward. The movements of reposition are first made outward, then outward and slightly upward, then altogether upward in the sense of flexion and extension of the foot. The movements must tend to correct the adduction of the fore-foot backward, to correct the twisting, to stretch the tendons, the ligaments, and the retracted aponeuroses on the internal portion of the foot.

The second stage of the operation aims to correct the equinus, and also acts upon the twisting. The right hand being placed as before, the tibio-tarsal articulation firmly maintained, the palm of the left hand is pressed against the entire plantar surface of

the foot. The right hand remaining stationary, the surgeon first makes, with the left hand, a movement rotating the foot from within outward, then extended movements of flexion in the tibio-tarsal joint (Fig. 2).

This method, well carried out, insures perfect reposition in from six to eight weeks. If the club-foot is difficult to reduce, if the deformity is great, and the patient cannot be regularly examined by the surgeon and carefully watched by intelligent parents, cure by manipulation alone often gives imperfect results and requires a long time. To avoid these inconveniences Redard has adopted, in such cases, the plan of forced reposition in a single operation with consecutive immobilization in a rigid apparatus.

F. Schultze ⁹⁹⁹ ¹⁶⁹ remarks that the forcible non-operative
_{V.3, Nos. 3,4; Aug., '95}

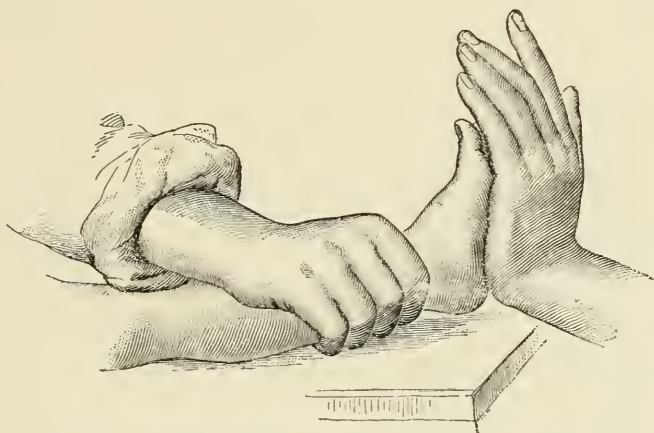


FIG. 2.—EQUINO-VARUS. (REDARD.)

Gazette Médicale de Paris.

method of König is preferable to all others. All club-feet can be straightened without surgical operation up to the age of 30 years. Tenotomy of the tendo Achillis should only be attempted after the foot has been brought into the abduction position. Operative measures should only be resorted to when it is impossible to achieve the result in any other way.

Ambrosio ⁵⁸⁹ ^{p.327, '95} states that in cases of extreme deviation Phelps's method is insufficient and posterior tarsectomy is necessary; that is, extirpation of the astragalus and the bones which prevent reposition. Resection of the external malleolus, the cuboid, the anterior apophysis of the calcaneum, and even the scaphoid, was necessary in one case. Gross's method, cuneiform resection of the calcaneum, has also given good results.

The results of the treatment of club-foot at the Jena clinic

are given by G. Hensel,²²⁶_{B.47,H.3,4,'94} who states that within five years and four months 53 cases were treated: 36 congenital and 17 acquired. Of this number 47 were followed up by the author at the end of one or more years, for the purpose of estimating the relative value of the methods employed. The best results were obtained after Phelps's operation, the next best by cuneiform excision of the tarsus, supra-malleolar osteotomy, and lastly tenotomy with reposition. The last procedure was followed by the greatest number of relapses, doubtless because it was employed in too severe cases. In many cases of long standing, tenotomy with forced reposition is insufficient; yet the author believes that such simple measures should first be tried, since they frequently give surprising results in paralytic club-foot with relatively soft bones.

T. H. Kellock, of London,⁶_{Mar.30,'05} speaking of Phelps's operation, alludes to the tendency to relapse which takes place some time after the abandonment of the splints or other supports which have been used to keep the foot in the corrected position, the part of the foot in front of the wound becoming slightly adducted and the sole inverted. This appears to be particularly the case in those instances where the large, open wound resulting from the operation has been allowed to granulate and close by itself, and may be obviated, to a certain extent, by planting epithelial grafts taken from some other part of the body on to the raw surface at the time of, or soon after, the operation. In cases treated in this way, however, the resulting scar is unsightly, and there remains a deep sulcus formed by the drawing together of the sides of the wound thus covered by epithelium. Kellock states that this might be further remedied by making use of some of the redundant skin which is always present on the outer side of the foot when this has been brought into the straight position. After dividing the tendo Achillis subcutaneously and completing the operation as described by Phelps, with division of the tendons of the tibialis anticus, tibialis posticus, and flexor longus digitorum muscles, the foot could be brought into a very good position; a flap of the whole thickness of the skin, about an inch wide, was then cut on the outer side of the foot by two parallel incisions reaching from the upper end of the operation wound to the sole, and dissected off the underlying structures, the skin being brought together underneath it by sutures. Five or six days later, the flap appearing to be thoroughly well nourished, the lower end was divided, and, leaving the upper end still attached, was turned across and secured by one or two horsehair stitches into the deep wound on the inner side of the foot, which was by this time mostly covered with granulation-tissue and the foot and leg fixed in plaster of Paris.

The healing of both wounds was quickly accomplished and the plaster-of-Paris splint dispensed with about three months after the operation.

Robert Jones, of Liverpool, ²²_{July 3, '96} maintains that talipes equino-varus is always an avoidable condition, and that the relapses so often alluded to are generally due to carelessness on the part of patients and friends and sometimes on the part of the practitioner.

[This is correct.—R. H. S.]

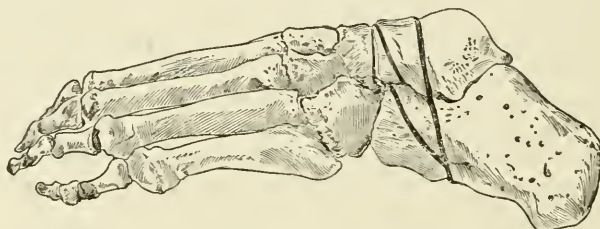
The relapses frequently occur because the surgeon does not recognize their causes,—(a) insufficient correction of deformity, (b) superincumbent body-weight on outer side of tarsus, and (c) slack and lengthened state of muscles opposed to the deformity. Phelps has described uncommonly good results by means of his open incision, and Jones has personally seen some very useful feet after Lund's excision of the astragalus, but the author argues that Phelps's operation has more effect on the varus deformity than on the equinus, and the cases he has seen after the operation seem rather deficient in the power of putting the heel to the ground. Phelps's argument for open incision is founded on the ground that it is indiscreet to work in the dark, but at the same time it is noticeable that he has very considerably modified the length of his incision; so that it becomes almost essential, by reason of the small incision now made, to introduce out of sight the tenotome for the division of some of the deep structures. Jones has performed Lund's operation on six cases and wedge-shaped tarsectomy thirteen times; but, although his results were fairly satisfactory, he has discarded the operative treatment for that of forcible wrenching. He describes in detail the mode of twisting by means of Thomas's wrench. He always divides the tendo Achillis before proceeding to further treatment, as its contraction often has to do with the varus deformity as well as that of the equinus. He rarely finds it necessary to divide any other tendons. Occasionally several wrenchings are preferable to forcing the foot into position at once. After each wrenching the foot becomes quite capable of being molded into any position.

Bristow showed to the Brooklyn Medical Society ¹⁵⁷_{Aug., '96} a case of club-foot acquired post-partum, which was relieved by a Phelps operation with tenotomy of the Achilles and tibialis posticus tendons on one side, and of the plantar fascia and Achilles and tibialis posticus tendons on the other.

Excision of the astragalus appears to be the operation most in favor with surgeons, if we may judge from statistics of 435 operations on the bones in club-foot collected by H. Augustus Wilson, of Philadelphia. ²⁰⁸³_{'94} (See ANNUAL, 1895, vol. iii, G-21.)

E. Muirhead Little, of London, ²_{Oct. 19, '95} suggests, however, that this is a rough-and-ready procedure the effects of which cannot be accurately foretold, that it shortens the limb and needlessly mutilates the foot, and that its results are often unsatisfactory,—so much so that further operations often have to be undertaken.

Even in the worst of these cases the bony “block” is not encountered until flexion reaches within about 15 degrees of the right angle. If the range of movement already existing can be preserved, but 90 degrees be substituted for 105 degrees as the flexion limit, the result must, he thinks, be considered satisfactory. This end can be attained by removing a wedge from the neck of the astragalus and anterior portion of the os calcis, leaving the body of the astragalus *in statu quo* between the malleoli. If the base of this wedge be directed outward as well as upward, any varus tendency can be corrected at the same time as the equinus. The annexed



SKELETON OF LEFT FOOT SEEN FROM OUTER SIDE. (LITTLE.)

British Medical Journal.

sketch of the skeleton of a normal foot shows the wedge to be removed.

In any average-sized adult foot the removal of a wedge having a base half an inch thick means the gain of 8 or 9 degrees of flexion. A wedge of this size is easily removed without going beyond the neck of the astragalus; by including the head also in the wedge the gain may be nearly doubled, but this can seldom be necessary.

Gross, of Nancy, ³_{Aug. 28, '96} considers the method of choice in old congenital equino-varus to be extirpation of the astragalus with complementary resection of the great apophysis of the calcaneum. He has previously given ³_{p. 233, '91} the anatomico-pathological facts upon which he bases his procedure.

Gregory Doyle, of Syracuse, ¹⁷⁰_{July, '96} to remedy the tendency to inversion of the feet, which follows even successful tenotomy and reduction, devised an appliance which he terms “spiral rotator.” It is made of flexible spiral-spring shafts, attached to a pelvic belt at their upper ends and to the soles of the shoes at the lower ends.

When this is properly fitted and applied to the patient his feet and limbs can be rotated to any desired angle. While wearing it the patient is able to assume any desired position without interrupting the automatic action of the instrument. (See cuts.)

Kirmisson, of Paris, ⁸⁵³_{Nov. 1, '94} publishes a very interesting case of Madura foot, in a child 2 years old, that showed no trouble but equino-varus, normal in appearance and without complication.

Stretching of the tendo Achillis by separation and immediate suture of the two ends was performed by L. Prioleau ¹⁰⁴³_{Oct., '94} in a case of paralytic equino-varus.



FIG. 1.

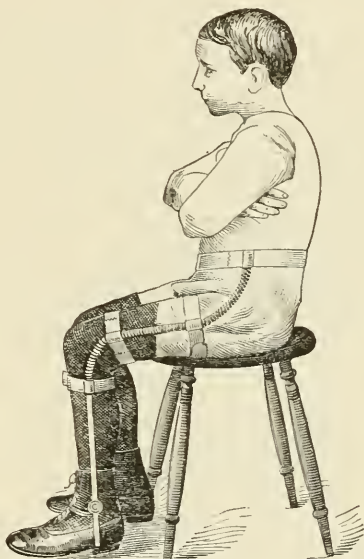


FIG. 2.

SPIRAL ROTATOR. (DOYLE.)

Fig. 1. Patient walking, showing the feet everted by spiral rotator. Fig. 2. Patient sitting, showing flexibility of the spiral rotator.

Buffalo Medical and Surgical Journal.

W. J. Taylor, of Philadelphia, ⁸⁰_{Dec. 15, '94} records the amputation of both legs at the knee-joint for paralytic club-foot in a case of spina bifida, complicated by congenital inguinal hernia, in which the testes and appendix vermiformis were removed during an operation for its radical cure.

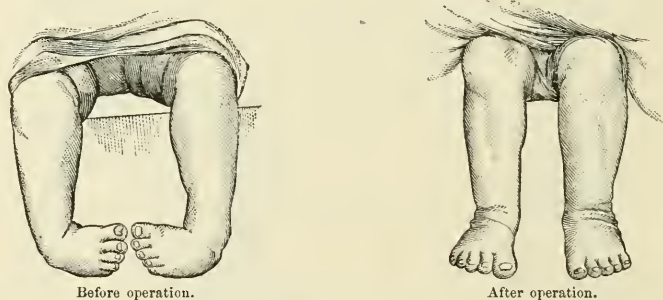
Talipes Varus.

It occurred to W. Barton Hopkins, of Philadelphia, ⁹⁶_{Apr., '95} that a badly-treated Pott's fracture, in a case of talipes varus, would tend to correct the varus, almost every characteristic of the one having its counterpart in the other. The flat-foot, the rotation

outward, the strain upon the internal lateral ligament, the outward deflection of the plane of the ankle-joint seen after Pott's fracture, and the exaggerated arch of the foot, the rotation inward, the strain upon the external lateral ligament, and the deflection inward of the plane of the ankle-joint of varus offered an opportunity to obtain a resultant of deformity and injury by artificially causing the deformity which follows fracture of the fibula just above the ankle.

The objections that would quite naturally appear to such a measure—(1) that a limb so treated would always be functionally weak, because deformity after Pott's fracture is apt to impair the strength of the ankle-joint; (2) that a cure so effected would not be permanent, but that the deformity would relapse after a time on the one hand, or, on the other, that a condition of valgus might ensue from overcorrection—are, he thinks, unfounded.

Selecting an inveterate case of talipes varus in a boy of 4



DOUBLE TALIPES VARUS. (HOPKINS.)

Annals of Surgery.

years of age, one in which tenotomy of tendons and fasciæ and the continuous use of a properly-applied brace had failed to effect a cure, the following operation was done at the Episcopal Hospital: An incision two inches long was carried down the fibula to within half an inch of the external malleolus. The fibula having been exposed, five-eighths of an inch of its shaft was resected, the sections being made with a fine saw. Forcible abduction of the foot almost corrected the deformity and closed the hiatus between the fragments to within perhaps one-sixteenth of an inch, and they were held in apposition by three or four turns of silk-worm gut carried through minute drill-holes in lower and upper fragments. The wound was dressed in the ordinary way, and the limb placed upon an internal metal splint. The wound gave no trouble, union being almost primary, and the child walked, four months after the operation, squarely upon the sole of his foot.

Swan, of Dublin, ²_{Apr. 6, '95} shows that the factors of foot inversion commence below the knee. The tibia is in its normal position, but the lower extremity of the fibula is deflected forward and is considerably in front of the position which it should normally occupy. This anterior position of the fibula is normally found in the quadrumana. He proposes to remedy this condition by a careful transverse division of the tibia alone at the junction of its middle and lower thirds. The fibula must be left intact. The lower fragment is rotated outward and the foot thus brought into a straight position. He had adopted this method in many cases with perfect satisfaction.

Talipes Valgus.

B. Merrill Ricketts, of Cincinnati, ⁹⁹_{May 23, '95} states that children are born flat-footed, and savages wearing no shoes are always flat-footed, while civilization tends to obliterate flat feet. Flat-foot is principally due to failure of the tarsal bones to become rigid, the condition becoming aggravated by age. The chimpanzee has but little arch. The posterior part of the gorilla's os calcis touches the ground. The manner of dressing the feet in early life is a prominent factor in producing deformed feet. All flat feet which cause pain or deformity should be operated upon, preferably by Trendelenburg's method.

[The editor thinks that operations on the bones are called for only in the most exceptional cases of talipes valgus. Forced reposition and support, combined with massage, are usually much to be preferred.—R. H. S.]

R. W. Lovett and John Dane, of Boston, contributed a joint paper to the American Orthopædic Association, ¹_{Sept. 28, '95} in which they submitted the following conclusions: 1. That the feet of the infant at birth are not flat; that the tracing at that time resembles the adult normal foot. 2. That a body of fat develops under the arch which gives the appearance of flat-foot for some years, and that at the age of 4 or 5 years this is absorbed. 3. That the smoke tracing is not a perfect method of studying abnormalities of the arch of the foot, because it fails to detect the slighter cases or to record pronation. 4. That the element of pronation is more constant than breaking down of the arch of the foot and may be entirely separated from it. 5. That the condition of pronated foot without breaking down of the arch of the foot should be recognized, and not confounded with flat-foot. 6. That the treatment of pronated and flat-foot is the same, and consists in the use of proper boots, the application of a pad or plate, the stretching of the gastrocnemius muscle where it is shortened, and the routine

use of massage, if obtainable, and always of exercises to develop the muscles which hold up the arch.

A praiseworthy study of the so-called flat-foot, with reference to its causes, its diagnosis, and its cure, is presented by Royal Whitman, of New York, ^{Nov. 9, '55} together with an analysis of a thousand cases. He presents the following propositions: 1. The normal foot may be made to assume an attitude resembling that of the so-called flat-foot (Fig. 2). 2. The deformity of flat-foot is a permanent exaggeration of a normal attitude (Fig. 1); it follows, then, that the habitual assumption of the simulating posture predisposes to deformity. 3. This passive attitude that simulates deformity may be simply the result of habit; but, on the other hand, it must be assumed if the mechanism is weak or overburdened, if leverage cause pain, or if normal motion is any way restricted. 4. Weakness may be prevented by guarding the foot from injury and improper use. Deformity may be cured by the removal of obstructions to normal use, by protecting the foot during the period of weakness, and by restoring the normal balance between the work to be performed and the ability of the mechanism. In conclusion, the following points are again emphasized: Flat-foot, in its surgical sense, is a compound deformity, of which the elements of valgus and abduction, the improper distribution of the weight and strain, are of vastly greater importance than the depth of the arch. The weak and flat foot can be cured, but only by the application of the simple principles that any mechanic would apply to a disabled machine whose structure and use were known to him; in other words, there can be no permanent cure of weakness and deformity unless normal function is regained or any effective treatment unless it has this end in view. The term "weak foot" has at least this advantage,—that it implies nothing that the student must unlearn, for, if functional weakness is recognized, its causes may be analyzed and appreciated; it is because of the misapplication and misapprehension of the term "flat-foot," and because of the associations which have so long obscured the rational treatment of the deformity, that the term has been discarded from the title of their paper.

Hoffa, of Würzburg, ³³⁶ _{July 6, '95} most emphatically recommends his mode of treatment. The method consists in a combination of manual mechano-therapeutic measures (massage twice daily; also gymnastics, forcible straightening) and the wearing of suitable soles,—so-called flat-foot soles. There are a great variety of these soles; they represent, in a certain measure, the schema of a normal foot and force the entire foot to press upon a sort of inclined plane. The result attained after a treatment of several weeks consists in

the fact that the useless and painful flat-foot resumes its functions and that the pain disappears. Upon prolonged use of the sole the foot regains an almost normal arch, even in very severe cases; this has been demonstrated by a series of foot-prints taken before, during, and after the treatment.

Kirmisson, of Paris, ¹⁴_{June 5, '95} states that some of his colleagues tried Ogston's method after reading a successful case published by himself in 1890; generally, however, they were not satisfied with the results and preferred Trendelenburg's operation,—osteotomy of the lower end of the bones of the leg. This latter procedure, however, only corrects the deformity by causing a second angular deviation of the malleolus, thus bringing about a true bayonet-shaped deformity.



FIG. 1.—TYPICAL FLAT-FOOT OF MODERATE DEGREE, ILLUSTRATING THE COMPONENT ELEMENTS OF VALGUS, ABDUCTION AND DEPRESSION OF THE ARCH. (WHITMAN.)

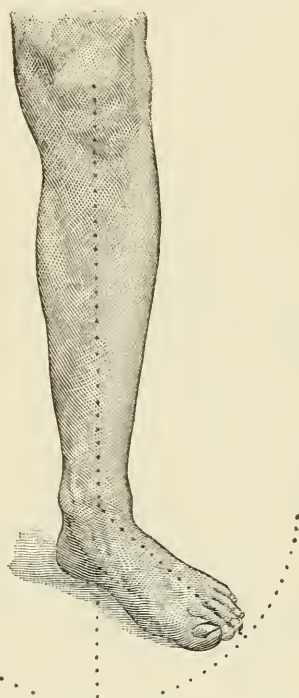


FIG. 2.—AN ATTITUDE THAT SIMULATES FLAT-FOOT. (WHITMAN.)

New York Medical Journal.

Ogston's method, on the other hand, insures complete reposition of the axis of the limb, and for this reason Kirmisson regards it as the method of choice in painful talipes valgus.

Sir Wm. Stokes, of Dublin ²_{Dec. 1, '94} advises an astragaloid osteotomy, removing the greater part of the head of the bone (which is hypertrophied), the apex of the wedge extending to the body of the bone. In this way the mediotarsal joint is not destroyed, as in Ogston's method.

Ghillini, ³³⁶_{Apr. 6, '95} being called on to operate on a boy of 14 years,

with paralytic talipes valgus dating from his first year, ascertained that the interior tibial did not respond to electrical stimulation, and decided to make use of the peroneus longus to replace the anterior tibial. The results were very satisfactory, the functions of the limb being restored to a great extent.

Brunelli, of Milan, ^{Aug. 10, '95} advocates the employment of the bicycle in the treatment of flat-foot, believing that it affords needed exercise to the most debilitated muscle-groups controlling the ankle, with the foot in a favorable position and with superincumbent weight largely eliminated.

Tarsalgia.—J. E. Goldthwaite, of Boston, ^{June 6, '95} states that in walking the anterior transverse arch is continually being obliterated and reformed. In metatarsalgia, however, the arch does not reform itself. The author found the obliteration of this arch very common, but seldom producing symptoms. He thought, in a limited number of cases, however, it was the cause of irregular attacks of pain and the formation of a painful callus. The pain was at times constant and at other times paroxysmal (similar to that which has been described as anterior metatarsalgia), and was usually referred to the centre of the foot, near the head of the third metatarsal bone. The location of the pain is in the interspace between the fourth and fifth metatarsal bones. The treatment of this condition consists in the reformation of the arch. In some instances this has been accomplished by simply bandaging the foot tightly,—a method which prevents the foot from widening when weight is borne upon it. In other cases it has been done by the use of felt pads or leather inner soles so padded as to bring pressure just behind the heads of the second and third metatarsal bones. A metal plate has also been used. Exercises, massage, and stimulating bathing are also of value.

Bloch ²⁰⁸⁴_{'95} states that in cases of obscure tarsalgia, if the cuboid be pushed back with the index finger behind the projection of the fifth metatarsal bone, a momentary relief of the pain will be obtained, ceasing as soon as the pressure is removed. This is the cuboid sign of Bloch.

Hallux Valgus (Bunion).

Warbasse ¹⁵⁷_{Oct., '95} suggested that there seems to be some discrepancy of opinion as to the etiology of hallux valgus. König, in his most recent publication, lays a great deal of stress upon certain constitutional conditions associated with a gouty diathesis and those conditions which predispose to such difficulties, and points out that the shape of the shoe is not a matter of such great importance as has been supposed; that persons who have worn very

broad shoes develop this disease, whereas other persons of the same age and habits, wearing very narrow shoes, actually cramping the foot, never develop the peculiar deformity which has been described. As to the treatment, he recommends the decapitation of the first metatarsal bone by an oblique incision so as to throw the axis of the great toe somewhat inward, closing the wound and obtaining a false joint with a very moderate degree of motion.

George Wackerhagen, of Brooklyn, ¹⁵⁷_{Oct., '95} recently practiced an operation devised by Riedel, of Jena. An incision was made over the bursa, which was dissected out. The joint was then opened on the inner side by an incision extending from over the head of the metatarsal bone to about one-third the length of the first phalanx of the great toe down to the bone. The base of the first phalanx was then sufficiently exposed, and enough of it removed to prevent its crowding upon the articular surface of the metatarsal bone. If there has been suppuration of the bursa it is well to introduce a small drainage-tube into the joint, or, preferably, it may be packed with iodoform gauze and the sutures applied as for secondary suture; otherwise it may be sutured and the foot put up with a gauze wedge between the toes and a splint applied to the inner side of the foot. In Wackerhagen's case a small drainage-tube was introduced, which somewhat delayed the healing, although the result is perfectly satisfactory, with the great toe in normal position without any unusual prominence at the head of the metatarsal bone. In the discussion Pilcher referred to the operation to which Fowler called attention some years ago, as one which might be considered in connection with this, in which an incision was made to the inside,—that is, between the great and the second toe, splitting the parts and exposing the joint on the side adjacent to the second metatarsal bone, opening the joint and throwing the phalanges outward so as not to disturb the ligaments upon the outside and to make no cicatrix upon the outer side. Then the head of the metatarsal bone being exposed, this was sliced off and then the parts replaced. The advantage of this operation was that it left no cicatrix on the outside of the foot.

According to Emerich Ullmann ⁸⁴_{Dec. 1, '94} the method of choice is extirpation of the sesamoid bone and transplantation of the flexor longus of the great toe upon the tendon of the extensor muscle of the same toe.

Ingrowing Nail.

Eliza H. Root, of Chicago, ¹_{Nov. 24, '94} states that in the obstetrical ward of the Chicago Hospital for Women and Children a baby

was born with ingrowing toe-nail. When the infant was discharged from the hospital at 2 weeks old the nail had continued growing in. The mother was requested to return with the child in two or three weeks, but has failed to do so. The infant, to all appearance, was healthy. The same writer recalls another case, that of a paraplegiac, caused by an abscess of the vertebra in the dorsal region of the spinal column. She was in bed over a year. The nail began to grow in during this time and was under surgical observation throughout its course. The pain and annoyance it caused the patient were some of the symptoms of returning sensation and motion to the limbs.

Outside of the constitutional condition, F. Regnault ⁸²⁷_{Sept. 5, '94} recognizes two factors in ingrowing toe-nail,—traumatism and microbial infection from dirt. Ingrowing nails in healthy and cleanly subjects are readily cured by prolonged baths in carbolic-acid solution and antiseptic dressings.

According to the experience of O. Bloch, of Copenhagen, ³⁷³_{No. 15, '95} ingrowing nail of the large toe is generally caused by a small and often unnoticed lesion produced when the patient cuts and treats his nails; the lesion becomes infected and gives rise to the well-known phenomena. The lesion can, however, also be caused by the sharp edge of a badly-cut nail producing a solution of continuity of the adjacent skin, the epidermis of which has been removed by the patient. Ingrowing nail is most frequently met with on the tibial side of the hallux; in a patient who cuts his nails with scissors a tibial ulceration will most frequently be found on the right side, a fibular on the left owing to the fact that these localities are most exposed to injury from the scissors. Badly-fitting boots and shoes, the shape of the nail, deformities of the toes, etc., are, according to Bloch, of secondary importance. To avoid ingrowing nails it is of importance to keep the feet clean, to avoid lesions with scissors and knives, and not to touch the epidermis under the free edges of the nail. (Report of Holger Mygind, corresponding editor, Copenhagen.)

[Pressure of the toes against each other will cause a corn under the edge of the nail, where it presses against the epidermis, which is intolerably painful and is quite independent of the feet being clean or dirty. If the patient injure the skin in his efforts to relieve the pain and also has dirty feet, the toe will undoubtedly be much worse; the bad ingrowing toe-nails we meet are the result of this and of neglect, but they all begin as slight affairs, and dirt plays only a secondary part in their production.—R. H. S.]

Dardignac ⁹¹_{June, '95} describes a modification of Quénu's method for the treatment of ingrowing nail consisting of displacing the

lateral incisions, lowering them at the posterior extremity, and cutting the autoplasmic flap from within outward.

Paralytic Deformities.

De Forest Willard, of Philadelphia, ⁵¹_{Sept., '94} offers the following conclusions in relation to paralytic deformities: 1. Prevention of deformities by means of apparatus and other measures is exceedingly important. 2. When contractions have occurred the employment of surgical measures should, as a rule, precede the application of mechanical appliances. To attempt to overcome these deformities by mechanical means is to needlessly inflict great pain and consume much time, and the final result is no better than when surgical procedures are employed. 3. Myotomy and tenotomy, either subcutaneous or open, are perfectly safe operations; they are usually remarkably effective and leave the muscles in a better condition for action than before the operation. 4. In contractures at the hip free open incision is usually preferable; at the knee subcutaneous section can frequently be performed, but when fascial contractions occur in the central popliteal space open incision is necessary and excision is occasionally demanded. At the foot subcutaneous division usually is sufficient; tarsectomy is seldom necessary. Fasciotomy is frequently required. 5. Forcible straightening following division is important. Rectification should be complete at the time of operation and all contracted tissues should be divided. 6. In spastic paralysis lengthening the tendons by tenotomy assists in restoring muscular equilibrium and, consequently, secures better subsequent locomotion. 7. Free section of the adductors is often advisable. 8. The best subsequent dressing for maintaining abduction while the patient is in bed is the application of a rigid dressing to the knees. The legs can then be fastened widely apart. 9. Mechanical appliances with lock or stop joints are important, and artificial support by wheeled crutch or other measures will assist in restoring muscular power.

A new operation for deformities following infantile paralysis is described by S. E. Milliken, of New York, ⁵⁹_{Oct. 26, '95} as follows: "Believing this to be the first case reported where a healthy muscle has been made to do the work of one which was completely paralyzed without in any way interfering with its own function, the following details are presented, as the success of the operation speaks for itself: On February 14, 1894, under ether anæsthesia, an incision one and one-half inches long was made, extending from just below the annular ligament obliquely over the tendons of the extensor proprius pollicis and tibialis anticus. (See Fig. 1.) The sheath of each tendon was carefully opened for a distance of about

one inch. The tendons were then split with a small Adams fasci-knife and an inch flap taken off of each, the flap from the tibialis anticus, of course, being left attached to the distal, while that from the extensor of the great toe was attached at its proximal, or muscular, end.

“Before incising the tendon of the extensor of the great toe it was pulled down by means of a blunt hook so that a flap could be gotten as high up as possible. This was done for two reasons,—first, so as to relax the tendon, thus relieving the ‘hammer

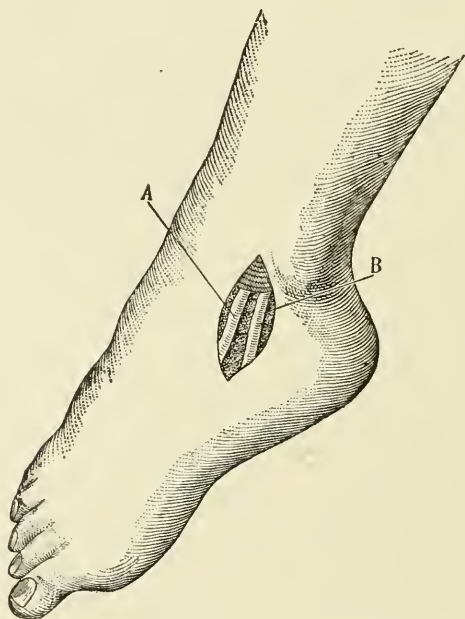


FIG. 1.

OPERATION FOR DEFORMITIES FOLLOWING INFANTILE PARALYSIS. (MILLIKEN.)

Fig. 1. A, showing tendon of extensor proprius pollicis; B, showing tendon of tibialis anticus.

Medical Record.

toe,’ and, second, so as to insure the action of the extensor proprius pollicis on its new insertion if union were obtained. The cut surfaces of the flaps were adjusted and sutured with three fine kangaroo-tendons interruptedly (Fig. 2). The outer flap of the sheath of the extensor proprius pollicis was then sewn to the inner flap of the sheath of the tibialis anticus (Fig. 3) with a continuous suture, so as to prevent the newly-united tendons becoming adherent to the overlying structures, thus making a new sheath, which would not interfere with the action of the muscle, which was to do its own work and that of the one which was paralyzed.

The skin was closed with fine interrupted catgut sutures and dressed aseptically. The foot was immobilized with a plaster-of-Paris splint, the deformity having been previously corrected by manual force. The case progressed uninterruptedly, and it was dressed for the first time on the tenth day, a window being made over the wound in the plaster for that purpose. The catgut sutures had been absorbed, but the skin had not united primarily, as I had hoped it would; however, there was no pus, nor had there been as much as one degree elevation of temperature since

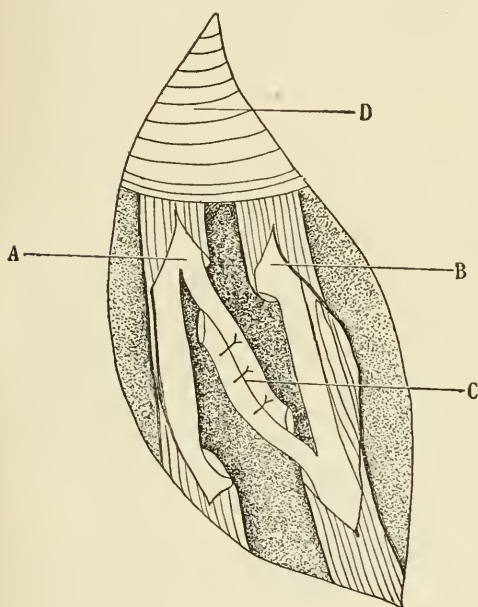


FIG. 2.

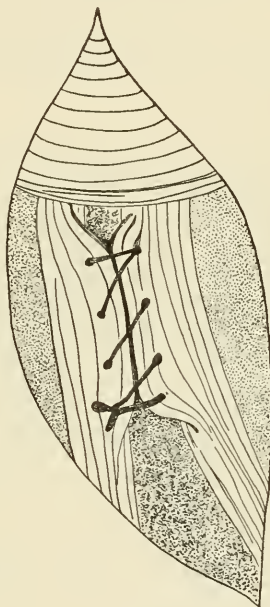


FIG. 3.

OPERATION FOR DEFORMITIES FOLLOWING INFANTILE PARALYSIS. (MILLIKEN.)

Fig. 2. A, tendon of extensor proprius pollicis; B, tendon of tibialis anticus; C, flaps united with interrupted sutures; D, annular ligament of ankle. Fig. 3. Showing sheath of the tendons united with continuous suture.

Medical Record.

the operation. The non-union was caused by the pressure of the plaster-of-Paris splint, which had been put on rather snugly. Under balsam-of-Peru dressing the skin wound healed in ten days. Every day for three weeks after the operation gentle passive motion of the great toe was made, so as to prevent the tendon becoming adherent to its sheath. The foot was kept in a plaster-of-Paris splint for six weeks, when a very light brace with a limited joint at the ankle was applied. The immediate improvement in the case was even noticed by the parents, as the foot no longer became abducted when an attempt was made to raise it, such

having always resulted before the operation was performed. It is now five months since the brace was left off altogether, and, although there has never been any electricity or massage employed, the boy has been encouraged to take all the exercise possible. He is now quite an expert on roller-skates, walks without a limp, and can adduct the foot to almost normal. There is still a slight 'hammer toe' on extreme flexion of the foot, but nothing as compared to the condition before operation, while flexion of this foot on the leg is almost as good as the unaffected side."

[Tendon transplantation is a very useful procedure in many cases of paralysis, but is not original with Milliken. Nicoladoni reported cases of tendon transplantation a long while ago, and B. F. Parrish, of New York, published some cases in 1892.—R. H. S.]

Joel E. Goldthwaite, of Boston, ¹_{Sept. 28} ⁶⁷³_{Nov., '95} calls attention to the possibility of furnishing better mechanical attachments for certain non-paralyzed or only partially-paralyzed muscles as a part of the treatment of infantile paralysis. He reports a number of cases in which the results had been most gratifying and from which it appeared not unreasonable to class tendon transplantation with tenotomy and the other surgical procedures that had a place in the treatment of this condition. At the knee undoubtedly tendon transplantation could be employed to advantage in a certain limited number of cases, and possibly at some of the other articulations, although the best results were to be looked for in those portions of the body where the tendons were well formed and lay superficially.

Thévenon, of Amiens, ²²⁸_{July 15, '95} describes two cases in which Blanc performed disarticulation of the knee for functional impotence of the lower limb following infantile paralysis.

The importance of early attention to the disability caused by infantile paralysis is pointed out by A. B. Judson, ²⁶_{Apr. 1, '95}

DISEASES OF THE BONES AND JOINTS, AMPUTATIONS, AND RESECTIONS.

BY THE CENTRAL EDITORIAL STAFF.

SUBMITTED FOR COMMENTATIONS TO

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DISEASES OF THE BONES AND JOINTS.

Osteomyelitis.

Etiology.—Lannelongue, of Paris, ¹¹⁵³_{Oct. 23, '95} contributed an excellent paper on the bacterial statistics of osteomyelitis. He was the first author to determine the microbic origin of the affection. The staphylococcus pyogenes aureus was at first considered by him as the sole infecting organism, but further bacteriological examination of ninety cases revealed the presence of the following microbes:—

Staphylococcus pyogenes aureus,	56 times.
Staphylococcus pyogenes albus,	11 “
Staphylococcus pyogenes aureus and albus,	1 time.
Staphylococcus pyogenes citreus,	1 “
Staphylococcus pyogenes aureus and bac. coli communis,	1 “
Streptococcus pyogenes,	10 times.
Streptococcus pyogenes and staph. albus,	1 time.
Pneumococcus,	3 times.
Undetermined micrococcus (? pneumococcus),	2 “
Bacillus typhosus,	4 “

[That Lannelongue was the first to discover the microbic origin of osteomyelitis is, to say the least, doubtful. The credit is probably due to Rosenbach, although Pasteur, Becker, and Ogsten were among the earliest to call attention to the question.—C. and F.]

Max Jordan ⁷⁶¹_{B. 10, p. 585; Apr., '95} ⁵ reviews the subject from the bacteriological point of view, and adds to the cases of osteomyelitis previously reported nineteen of his own, in all of which bacteriological examinations were made. Histologically, acute osteomyelitis is usually a purulent inflammation; occasionally it is of a serous or of an hæmorrhagic-septic type. Notwithstanding this, the identity of these forms is shown by their identical etiology and similar clinical type. It is almost always a secondary process, though the

primary focus of inflammation may have disappeared before the onset of symptoms of osteomyelitis. In these cases the osteomyelitis is frequently mistaken for the primary disease. Its onset is not infrequently very insidious. It usually affects first the ends of the long bones at or near the line of junction of epiphysis and diaphysis, and is almost exclusively a disease of the period of bone-development, its rare occurrence in adults being explained by the fact that in them the special conditions predisposing to the disease during the growing stage of the bone have ceased to exist. As already shown, a number of quite distinct species of bacteria have been found associated with osteomyelitis, and it is evident that Becker was wrong in supposing it to be a specific disease. It is most often caused by the staphylococci aureus, albus, or both, but may be caused by the streptococcus pyogenes, by the pneumococcus of Fränkel, or by the bacillus typhosus. It has been produced experimentally in animals by the soluble products of these bacteria and also by purely chemical irritants. The paths of entry of these germs into the body are the same as in other infectious processes,—through the alimentary tract, the respiratory tract, or the skin. A number of interesting cases are given by Jordan in which osteomyelitis occurred secondarily to boils, whitlows, and other comparatively insignificant lesions of the skin which ordinarily attract but little attention. In many of these cases cultures showed the same species of bacteria in the original skin-lesion and in the osteomyelitic pus. As far as etiology is concerned, then, acute osteomyelitis stands in the same relation to its cause that suppurative inflammation in other tissues occupies to the same causes acting on them. Since it is almost invariably secondary and is often associated with a number of other suppurative lesions in widely-separated parts of the body, Jordan considers it just to regard it as part of a purely bacterial form of pyæmia which shows a great disposition during youth to the formation of metastases in the bones because of a peculiar predisposition afforded by them during the developmental period.

[It is questionable whether it is strictly correct to speak of osteomyelitis as “pyæmia.” The essential features of a pyæmia are infected thrombi and emboli, while the facts seem to be insufficient to prove that these exist in osteomyelitis, especially in cases of intestinal origin.—C. and F.]

Canon ³⁰¹_{B.42,H.1,2} has made a bacteriological examination of 26 cases of osteomyelitis treated at the Moabit Hospital in Berlin. He found the staphylococcus aureus 11 times, the staphylococcus albus 4 times, the streptococcus 4 times, a diplococcus once, and a combination of bacteria 6 times. Examination of the blood was

made in only 12 cases; of these, negative results were obtained in 3 instances, the staphylococcus aureus was met with 3 times, the staphylococcus albus twice, the streptococcus once, a diplococcus once, and an association of bacteria once. It seems that the presence of the streptococcus indicates the severe nature of the case. Canon was able to reproduce the disease by injecting staphylococci into the veins of rabbits.

Akermann⁴⁵⁷_{May, '95} has found that intra-venous injection of the coli bacillus into young rabbits will give rise to inflammations of the bones very similar to those produced experimentally by the microbes of suppuration. These lesions predominate in the juxta-epiphyseal region and its corresponding epiphysis, especially the lower end of the femur and the upper end of the tibia, and corresponding to the acute forms of osteomyelitis. In other cases the lesions affect the chronic form, a small necrosed sequestrum being surrounded by young bony tissue produced by the periosteum.

Funke,⁵⁰_{Nov. 16, '95} in a study of 700 cases of acute osteomyelitis, noted that, while the proportion of the disease as regarded other affections in all other countries was 2 to 3 per cent., the proportion in Bohemia was 8 per cent., the etiological factors being, as elsewhere, traumatisms, fractures, and anginas. The staphylococcus was found, as a rule; in one case following typhoid fever the bacillus of that disease was also found.

[It may be doubted if such statistics lead to wholly reliable conclusions. Reports of cases in medical literature are governed, to a marked extent, by fashion in different places and at different times. One is scarcely justified in assuming, without further proof, that because more cases of osteomyelitis have been reported in Bohemia than in other countries the disease is more prevalent in that region.—C. and F.]

The connection between the Ebert-Gaffky bacillus and osseous affections is one of great interest. Typhoid fever may have many sequelæ.⁶¹_{Nov. 23, '95} As would be naturally expected, the identification of the Ebert-Gaffky bacillus as the specific cause of typhoid fever has been followed by a thorough investigation of the post-typhoid bone-lesions, and the results have established an undoubted relation between them and the primary typhoid attack.

Ebermaier obtained the bacillus of Eberth in pure culture from two instances of suppurative periostitis following typhoid fever. Orloff and Achalme found the same bacillus in pure growth under the same conditions. Others have made similar observations. Péan and Cornil describe necrosis of the tibia, occurring eight months after recovery from typhoid fever, in which the bacteriological examination showed the typhoid bacillus asso-

ciated with other organisms, and Fashing and E. Fraenkel both found the typhoid bacillus associated with pyogenic microbes under similar conditions. Then there are also examples of post-typhoid bone affections associated with the pyogenic cocci only. Such post-typhoid inflammatory and suppurative lesions in the bones may consequently be produced by the ordinary or less common pus-microbes alone or associated with the bacillus of typhoid fever, and careful investigations have also shown that they may be caused by the latter micro-organism alone.

Naturally, the question of the pyogenic properties of the typhoid bacillus is of much interest in connection with the sequelæ. Orloff and Adenot both caused suppuration in dogs and rabbits by the subcutaneous inoculation of pure cultures of the typhoid bacillus. More recently this problem has been subjected to an elaborate experimental investigation by Dmochowski and Janowski, and these workers reach the apparently incontestable conclusion that there is no animal tissue in which the bacillus typhosus may not cause suppuration under suitable conditions. Inasmuch as the pyogenic staphylococci and streptococci cause suppuration in various tissues only under what may be called suitable circumstances, it follows that the typhoid bacillus is similar to them in this respect, and it may be said that it is now settled beyond all doubt that the bacillus of typhoid fever, when in possession of a certain degree of virulence, possesses distinct pyogenic properties.

[In spite of the probability that the typhoid bacillus forms pus under certain conditions, these conditions are not often present. It is certainly the rule, in regard to bones and joints, that suppuration quite rarely occurs. Inflammation of the hip-joint and tibial nodes, which have often been observed, seldom result in suppuration.—C. and F.]

A satisfactory explanation of the occurrence of bone-lesions after typhoid fever has not as yet been advanced, but many valuable observations bearing on this point have been made. Thus Quincke demonstrated the presence of the typhoid bacillus in the spleen and the bone-marrow, especially of the ribs, as late as the seventh week of the disease. In nine cases examined, eight showed the organism in the rib-marrow. It has also been shown that this bacillus has a very marked tenacity of life outside of the body. Now, these points certainly throw some light on the development of post-typhoid bone-lesions at periods long after the attack of the febrile disease, but the causation of a distinct necrosis in one instance and not in another is the problem that baffles all efforts at explanation.

Parsons ⁹⁶_{Nov., 95} reviews the subject of post-typhoid bone-lesions

and describes six cases observed in the surgical clinic of the Johns Hopkins Hospital. Four of these were in men and two in women. The period after recovery from typhoid fever at which the lesions appeared varied from one to sixteen months. The character of the typhoid attack did not bear any relation to the occurrence of the bone changes. It is interesting to note the general fact that the symptoms of the bone infection, almost without exception, come on some time after convalescence has been well established. In one case only did the bone changes manifest themselves during the course of the fever. In Parsons's cases the lesions were situated in the ribs or the costal cartilages in three instances, in the tibia once, once in both tibiæ, and once in the left radius and the right tibia.

From the cases described in the literature it appears that almost any bone in the body may be involved, but that the tibia is undoubtedly the bone of choice, the instances in this situation greatly predominating, whereas the hands and the feet are remarkably free.

As a rule, the prognosis is good, although a fatal case of disease of the femur showing association of typhoid and colon bacilli has been reported by Klemm. Complete excision of all the diseased and suspected tissue appears to be the most satisfactory treatment. Mere excision is not sufficient, because it has been so often found that the micro-organisms will persist in the wound for an almost indefinite length of time.

[Recently, attention is being called quite strongly to the bone and joint lesions of typhoid. The question, however, is not a new one. W. W. Keen, of Philadelphia, gave an excellent review of the subject in a monograph published in 1877 in the "Smithsonian Miscellaneous Collections."—C. and F.]

Osteomyelitis of Infancy.—The osteomyelitis of infancy is considered by L. Braquehay³⁶³, ^{Apr. 27, '95} who bases the following conclusions upon a study of 44 cases: The disease is most frequent in infants under one year (21 out of 162 cases). It is frequently overlooked at this period of life, as the little patients afford but little indication and may die before swelling appears. The streptococcus and pneumococcus are much more frequently met with at this period than later on. Acute and chronic forms of the disease, with intermediate stages, may be distinguished from early infancy. The prognosis is graver as regards life than in adolescents, but it is much better as regards function of the members, as ankylosis does not occur, even after suppurative arthritis, there is no hyperostosis, but little lengthening of the limb, and rarely shortening. There is little tendency to the formation of sequestra

after acute attacks. Broncho-pneumonia is a grave complication and frequent even after convalescence. Trephining is indicated in the treatment, but not too extensively. The bony tissue readily regenerates at this period of life.

[A point of great importance is that insisted upon so strongly by Owen,—early incision before the formation of pus, with trephining if necessary, and removal of the infected medulla.—C. and F.]

A remarkable case of compensatory hypertrophy of a bone is reported by Marchant.⁸⁵³ ⁵ The patient was operated upon for an osteomyelitis of an aggravated character; at that time the patient was 13 years of age. There were multiple foci found in the thumb, clavicle, and especially in the right tibia and its articulation at the knee. The resection extended from the tuberosity of the tibia to two and one-half inches above the tibio-tarsal articulation. The periosteum was almost entirely destroyed in the upper part of this wound, and an arthrotomy of the knee was necessary. The patient was seen again six years after this operation. The leg had a curvature which had its convexity internally. The region of the knee was greatly enlarged. The middle portion of the tibia was almost entirely wanting, while the internal malleolus maintained its normal appearance. The knee was deformed by the presence on the inner side and posteriorly of the head of the fibula; the styloid apophysis of the fibula was on a line with the upper border of the patella, having been pressed there by the weight of the body and lack of development in the tibia. The foot maintained its normal relations, the hypertrophy existing in the fibula in its upper and middle thirds, where it was greatly thickened in the antero-posterior direction and on the anterior surface. There was considerable shortening, but movement remained very good to a right angle, and walking was easy without mechanical assistance.

A case of acute osteomyelitis of the sacrum was seen by Tixier¹⁴ ^{July 21, '95} seven days after its onset, which was sudden, the child being suddenly affected with chills and pain in the right thigh. There was great prostration and loss of appetite, with obstinate constipation. The pains in the hip increased progressively and extended to the entire leg. Two days later Jaboulay made an incision of twelve centimetres on the right border of the sacrum, penetrated the pelvis through the lesser sciatic notch, and with the index finger on the anterior surface of the sacrum broke open a pocket from which issued half a litre (pint) of pus. The pain ceased immediately.

Clinical History and Diagnosis.—Roswell Park, of Buffalo, ¹ _{Sept. 28, '95}

states that, clinically, there are three situations in which bone infections are most commonly met with: beneath the periosteum, in the epiphyses, and in the diaphyses. From the pathological side, infections are of four main varieties: (1) the tubercular; (2) the staphylococcal; (3) the streptococcal; (4) the pneumococcal. To these may be added rare instances in which other organisms are primarily or secondarily present. Of these, certainly the more common is the tubercular form, whose manifestations are usually not acute. The three others may be grouped, in a general way, as pyogenic forms of invasion in which pus is practically invariably produced, provided only that sufficient time had elapsed. The author alludes to the acute miliary tuberculosis of bone, which corresponds in most essentials with similar invasions of the lungs, and of which he has seen occasional examples. It is not quite so rapid as the pyogenic forms, and it may take two or three weeks to produce such destruction of the bone as to require operation. It stands, therefore, in an intermediate position between the acute infections and the slower (usually the tubercular) lesions. Nevertheless, it is sufficiently acute to demand prompt recognition, and when recognized may often be relieved by prompt operative interference. The course of a bone disease depends, first, upon the location of the lesion and, secondly, upon its character.

[It would be interesting if we were told how to recognize acute miliary tuberculosis of bone, and the nature of the operative interference which would be likely to benefit the patient. When miliary tuberculosis of a bone exists, it is more than likely that other portions of the body have suffered also, and that an operation would be of little real benefit.—C. and F.]

As showing the relative frequency of parts involved, in 30 cases observed by Kocher the disease had occurred 13 times in the tibia and 11 times in the femur. In 98 cases collected by Leucke and Volkmann, the femur had been involved in 36, the tibia in 34, and the humerus in 11. Disease in the immediate neighborhood of the hip-joint is about five times as common as in that of the knee. Comparing epiphyses with diaphyses and accepting Schede's 67 cases, of 28 cases in which the femur had been involved one half of them had been in the shaft and the other half in the diaphysis. In the tibia, of 27 cases only 9 had concerned the epiphyses, and of 7 cases of the humerus 2 had involved the epiphyses.

With regard to necrosis, it concerns orthopædists mainly in this: that it produces in many instances a weakening of the bone, which may lead either to fracture, to deformity, or to curvature. Spontaneous fractures of necrotic bone had occurred under the

writer's observation, and he remembered one case of a necrotic femur which had broken as he was lifting the patient upon the operating-table. Incidentally, there is danger of cancer in some of these cases, for Volkmann has collected 32 cases in which old and fistulous passages had become the site of epitheliomatous changes and in which cancer had been the final result.

During a residence of five years in Japan F. Grimm²²⁶_{B. 45, H. 3} observed 22 cases of acute osteomyelitis and 1 case of non-suppurative osteomyelitis or albuminous periostitis. All cases of albuminous periostitis are not of osteomyelitic origin, but may be due to tuberculous abscess or gummatous processes. On the other hand, accumulation of sero-mucous fluid is not uncommon in granulating wounds; so that it is not surprising to find it in bony cavities the walls of which are covered with granulations. The lymphatic serous fluid alone comes from the exudation, the mucin being derived from the destruction of tissues and accumulating from the fact that it is absorbed with difficulty.

L. T. Riesmeyer, of St. Louis,⁸²_{Oct. 6, '94} reports a case of tubercular osteomyelitis following the extraction of a molar tooth, the patient being a mulatto girl of 19 years. The disease affected the jaw, the left elbow-joint, the left ankle-joint, and other points. The arm was amputated, resection being impossible on account of the extension of the disease. Operation was also performed on the jaw and ankle, the patient reacting well, but dying within a year of tuberculosis of the lungs. The author states that in all probability the numerous inflammatory foci were due to a mixed infection, for a great many single cocci and some staphylococci were found in the pus and the masses of fungous tissues that had been scraped out, and the primary infection must have taken place, in all probability, in the wound due to the extraction of the tooth. Of interest also is the fact that all the inflammatory metastatic foci of the bones were located at the epiphyseal extremities. This may be explained by the fact that at the epiphyses the growth of bone is most active, small arteries entering large capillaries, whereby the circulation is retarded and absorption made less active.

According to J. Braquehay,³⁶³_{May 2, '95} the clavicle is frequently the site of osteomyelitis, with a special clinical aspect, according as the disease affects the internal or external extremity of the bone. The diagnosis is sometimes a somewhat delicate matter. Even after recovery peculiar complications may appear,—such as compression of the subclavian vessels and the brachial plexus by hyperostosis. As regards treatment, the author declares himself as opposed to extirpation of the clavicle at the onset of the disease,

as advised by Petersen. A case of acute osteomyelitis of the sternum is described by H. Gaudier, of Lille.¹⁷
Oct. 16, '94

Hahn,⁷⁶¹
B. 14, H. 1 in a study of vertebral osteomyelitis based upon seven cases found in literature and one examined in Bruus's clinic, states that the lesions usually involve the bodies of the vertebræ, the tendency of the pus being to burrow inwardly, either toward the vertebral canal or in the direction of the pleura, mediastinum, or peritoneum. The diagnosis can only be established in about one-half of the cases. Of the eight cases described only three recovered.

A case of osteomyelitis of the femur is described by Pilcher, of Brooklyn.¹⁵⁷
Aug., '95

A fatal case of acute osteomyelitis with purulent pericarditis is published by Lafarelle, of Bordeaux.¹⁸⁸
Dec. 16, '94

Paul Picou, of Paris,⁷
Dec., '94 describes a case of prolonged osteomyelitis, dating from the age of 3 years, in a man of 28 years, and which had caused complete ankylosis of the lower tibio-fibial, tibio-tarsal, tarsal, and Lisfranc's articulation, with the exception of the articulation of the first metatarsal with the great cuneiform.

A case of acute osteomyelitis in an adult, with early operation and complete recovery, is recorded by Bayard Holmes, of Chicago.⁹
Dec. 15, '94 J. Braquehay, of Paris,⁷
No. 19, '94 successfully treated a case of osteomyelitis of the fifth rib on the left side by subperiosteal resection of the diseased part.

Treatment.—Arthur Neve,²
Feb. 2, '95 in discussing the treatment of inflammatory affections of bone, put in a plea for: 1. Early drainage of the bone by drilling or trephining to save necrosis, etc. 2. Early subperiosteal resection to prevent pyæmia, exhaustion by discharge, and prolonged suppuration. The average resection healed in ten weeks soundly and without deformity. 3. Osteoplastic operations for spicula-necrosis or to close old cavities. 4. Gelatin grafts as a scaffolding for organizing blood-clot in aseptic bone-cavities. 5. Epiphyseal bone-grafts to fill gaps in the continuity of a long bone.

E. J. Senn, of Chicago,⁶¹
July 20, '95 describes a case of osteomyelitis of the ankle-joint in which bone-chip implantation proved of value. A sequestrum in the lower end of the tibia was removed and some superficial necrotic bone in the astragalus was dealt with by curettement. Cavity was disinfected with mercuric-chloride solution and hydrogen peroxide, dusted with iodoform, and packed with decalcified-bone chips. Recovery was uninterrupted, the patient bearing entire weight on foot in seven weeks. A point of interest in the case was that probably the osteomyelitis had its origin in the tibia above the epiphysis, and instead of the pus taking the

usual course and discharging on the surface after penetrating the wall of the tibia it extended to the epiphysis and emptied into the joint.

Curtillet ²¹¹_{MAR. 24, '95} describes a case of bipolar osteomyelitis of the tibia cured by radical intervention,—a sort of emptying of the cavity with the sharp curette, as recommended by Karewski, of Berlin, ⁶⁹_{NO. 40, '94} as a general treatment of acute osteomyelitis, who states that success is certain if the operation is done in the first week before periosteal suppuration has begun.

Gerster, of New York, ⁹⁶_{OCT., '95} performed a successful osteoplastic operation for total defect of the shaft of the tibia due to acute osteomyelitis.

Osteomalacia.

George Dock, of Ann Arbor, ⁵_{MAY, '95} gave an able review of the literature of osteomalacia, and described the case of a woman of 24 years, showing, among other points of interest, early and intense involvement of the femurs, early fracture of the left one, and absence of the typical osteomalacic pelvis,—the beaked or heart-shaped pelvis. The difference in the consistence of the bones in the early and later stages, which led Kilian and others after him to distinguish osteomalacia fracturosa and osteomalacia flexilis cerea, was well illustrated by early fractures and the gradual bending which took place during the last year of the patient's life. Microscopically the changes found were those of a very advanced period and bear out the ideas of recent investigators, that the anatomical process is of an hyperæmic and inflammatory character. Although regeneration of bone had taken place to a marked extent, the new tissue had, in turn, broken down; so that many of the changes represented late lesions, or degenerations, of a process itself secondary. The large number of osteoclasts found might, at first sight, have suggested the idea that the primary dissolution of the bone was due to these,—a fact considered of great importance by some, denied by others. Careful examination, however, made it certain that these bodies were in reality disposing of tissues of little value and probably predisposed to destruction. Study of the bones in various parts made it doubtful whether we can believe that the origin of the disease is to be found in inflammation or hyperæmia, and leads us back to the view, unsatisfactory as it is, that changes of a more recondite kind—either changes in metabolism or disturbances in the normal processes of breaking down and renewal of bone—lie at the basis of the disease. Dock remarked that, in his patient, sexual desire seemed abolished, in striking contrast to the usual rule in osteomalacia. The excretion

of lime-salts, the disposition of which in some cases is obscure, was very striking, and its effects on the kidneys and ureters and bladder very important clinically and anatomically.

Neusser⁸_{No.3,'92} had found an excess of eosinophile cells in the blood in a few cases of osteomalacia. Tschistowitsch,⁴_{No.38,'93} however, found that the lymphocytes were increased both absolutely and relatively, while the poly- and mono-nuclear cells were diminished. He concluded, therefore, that besides the forms described by Neusser, in which there is an increase of marrow-elements in the blood, there is another form of osteomalacia with an increase of lymphocytes. Dock was able to confirm the results of Tschistowitsch in his own case, the blood examined post-mortem showing 38 per cent. of lymphocytes, 52 per cent. of polynuclear cells, 9 per cent. of mononuclear and transition cells, and less than 1 per cent. of eosinophile cells.

G. Dorléans⁷⁴⁷_{Oct.15,'95} analyzed the bones in a fatal case of osteomalacia and found that they did not yield chondrin by prolonged contact with boiling water,—a result identical with that of Molschott and Tubini in normal bone. The quantity of collagenous tissue was normal, but the proportion of fatty matters from dissimilation was greatly increased. As had been previously noted by Chabrié, the diminution of lime corresponded to the increase of magnesium.

Neumann⁹⁵_{B.47,H.2,'94; Nov.10} examined the urine and fæces of a woman, aged 37 years, who was attacked with mollities ossium, which, as usual, made progress during pregnancy, though the child was delivered without instruments. The excretion of calcium by the kidneys in the progressive stage of mollities was much the same as in health. During the second stage, that of osseous regeneration and recovery, less calcium escaped through the kidneys, but rather more in the fæces. A slight relative loss of magnesium occurred during the progressive stage; on the other hand, that salt was eliminated in less than the normal amount during the second stage. The normal relation of calcium to magnesium in the excreta (1 to 3) was altered, the latter earth diminishing in amount. The loss of phosphoric acid during the progressive stage was found to be marked and continuous, and that compound was as evidently retained during recovery.

A case of osteomalacia with albumosuria is recorded by A. Raschkes.⁸⁸_{No.51,'94}

Clinical History and Diagnosis.—Dock⁵_{May,'95} remarks that osteomalacia, like all rare diseases, is frequently not diagnosed. Many text-books make it appear that in the later stages at least the disease cannot be mistaken. This assumes a greater knowledge

of diagnosis than is possessed by a large number of physicians, and it seems desirable that the differential points be alluded to more frequently than they are in connection with diseases with which osteomalacia may be mistaken. Osteomalacia is mistaken for some form of rheumatism more frequently than for all other diseases together. Much as the patient may think the pains rheumatic, a careful anamnesis and complete examination of the body would, in most cases, except in the earliest stage, prevent error.

Dock regrets very much that phosphorus was not given a more thorough trial. Had he known of the result obtained by Sternberg¹¹⁴_{B.22} he would have given the remedy in large doses, but in the light of the earlier reports he did not feel encouraged to continue it after he found the first administration badly borne.

Phosphorus and castration must be looked on as the chief remedies in the disease, the indication for the latter being especially the possibility of conception or the existence of pregnancy and need of Cæsarian section.

Latzko⁵⁷_{June 23, '95; July 20} refers to the contracture of the adductors of the thigh, which he has described as pathognomonic of osteomalacia. Various purely mechanical theories have been put forward to account for the limitation of abduction. It has been ascribed to the deformity of the neck of the femur known as coxa vara; to the trochanter coming in contact with the ilium; to deformity of the acetabulum. It is shown, however, that the diminution of the angle formed by the neck of the femur with the shaft has but little effect in producing limitation of abduction, and also that where, owing to the deformity of the pelvis, the acetabulum approaches the horizontal, abduction is but slightly impeded. The increase in power of abduction as the osteomalacia improves has been taken as evidence that there is no adductor contracture. In a series of cases it is shown that even the limitation that remains after recovery is due to active muscular contraction, not to shortening of muscle or shrinking of capsule, nor to any of the mechanical causes mentioned above, for under an anæsthetic the range of abduction was distinctly increased. The causes may, however, share in the production of the amount of limitation of abduction which remains even after deep narcosis.

Immermann²¹⁴_{Feb. 15, '96} describes a case of osteomalacia in a young man of 18, gradually developing throughout the entire bony system and still progressing at the time of report. The bending of the bones was accompanied by great pain, the deformities being most pronounced at the knees, pelvis, spine, sternum, and the shoulders. The patient was emaciated, weighing only 33 kilogrammes (72½ pounds), and his height being but 132 centimetres.

The skull not being involved, the head formed a striking contrast to the rest of the body. From an etiological stand-point, it may be noted that the young man had lived under defective hygienic conditions in a section of the Canton of Basel, Switzerland, near Ergolzthal,—one of the areas of predilection of the disease.

The chief points of interest in a case recorded by Drake-Brockman, of Muttra, India, ²_{June 1, '95} are: (1) the early age—namely, before 18—at which the disease manifested itself, (2) the exaggerated stage at which seen, (3) that the disease occurred after the first pregnancy, and (4) that there were not, nor had there been, any fractures of bone, notwithstanding the exaggerated stage of the disease and the extent of the deformities. The author attributes this probably to the fact that the disease occurred in such a young subject, at a time of life at which the bony skeleton was yet immature, and hence the chance of fractures occurring was minimized. He thinks that the rarity of the disease and the peculiarities present in the case are sufficient excuse for bringing it to the notice of the profession.

A case of osteomalacia in a non-pregnant single woman is recorded by S. Van Heerswyngels, of Brussels. ⁸⁶⁸_{May 18, '95} Virginité was ascertained by vaginal examination.

Péron and Meslay, of Paris, ¹¹⁸_{Apr., '95} describe a case of osteomalacia in a girl 15 years old. The authors call attention to the youth of the patient, the rapid course, the symmetrical deformities of the fingers, the muscular atrophy, and the classical post-mortem lesions of osteomalacia and their habitual localization.

Treatment.—The question of castration as a cure for osteomalacia is discussed by Ludwig Kleinwächter. ²⁹³_{B.31, H.1} ⁹⁶_{Sept., '95} Since 1879, when the operation of castration for osteomalacia was first suggested by Fehling, it has been done forty-one times, as shown by the tables of Fränckel. Many of the cases were improved or cured; some were not improved. The ovaries in this disease showed no characteristic lesion.

The author reports two cases of Cæsarian section in which the ovaries were not removed, but the patients both recovered from the disease. He thinks that in removing ovaries for osteomalacia we are groping in the dark. If the operation is followed by improvement it is accidental. Before undertaking major operations for the cure of osteomalacia it is necessary to know something of its pathology, which can only be learned by bacteriological and chemical investigations.

Labusquière, of Paris, ⁴⁸_{May, June, '95} ⁸⁰_{Oct.} quotes Winckel's conclusions that castration as a treatment of osteomalacia is indicated only when either every therapeutic method has been exhausted or when

the disease has so advanced that life is seriously and immediately threatened.

Truzzi collected 98 cases, only 52 of which he carefully studied, since the others were reported so shortly after operation as to make these records of little value. Of these 52 cases 36 were completely cured, 4 were nearly cured, 3 were cured after a recurrence, 3 were benefited, 4 showed persistent recurrence, and 1 was entirely unsuccessful. Truzzi states, as a result of his study, that incomplete cures or failures result in about 20 per cent. of all cases, but that better results may be obtained when both uterus and ovaries are removed. He points out that there have been no recurrences in cases in which both uterus and ovaries were removed.

Fehling ⁹⁵_{B.48,H.2,'95} reports 14 cases treated by castration and 6 by Porro's method. One case perished immediately after operation from intestinal occlusion; 1 case disappeared after a year; 4 cases, after remaining well two or more years, died,—1 of heart disease four years after intervention, 1 of pulmonary phthisis three years after operation, 1 of cancer of the stomach and pulmonary hæmorrhage after two years, the fourth of an unknown affection after three years. Eight cases operated on are still alive. Six of these are in perfect health; 2 remained well for two years, then showed some slight recurrence. In other words, in 12 cases there were 12 cures, which persisted for from two to seven years; 2 were only partially successful, but there was enough improvement to enable 1 of them to walk. In those cases reported in which Porro's operation was performed, 1 died of septicæmia; of the remaining 5, 4 are perfectly well and the fifth presents slight recurrence. The criterion of definite cure was the ability to walk and work without pain in the bones and the complete suppression of the menses.

Labusquière concludes his paper as follows: The etiology of the disease is unknown. Medical treatment sometimes cures, and should be tried. When the disease is well advanced and has resisted all other treatment, bilateral castration should be performed. In certain aggravated conditions the utero-ovarian amputation is indicated. When the woman is pregnant, induction of premature labor should rarely be considered. At term, the choice between Porro's operation and Cæsarian section should be made. The former operation should usually be chosen.

Poppe, of Oberplanitz, ²⁰⁸⁸_{'95} reports three cases cured by castration, once combined with Cæsarian section.

Polgar ⁹⁵_{V.49,No.1} ³¹⁷_{Nov.9,'95} publishes seven cases of osteomalacia observed at the Kézmarszky Clinic at Budapest. The administration of syrup

of iron and codliver-oil caused a temporary improvement. Castration resulted in complete recovery in all but one case, in which the operation only produced a lasting improvement. One case ended fatally through sepsis. In one case Porro's operation was performed at the end of the pregnancy with favorable results. The author advocates castration.

J. Weil⁸⁸_{Nos. 5, 6, '96} reports two cases of osteomalacia—one of which was cured by castration, the other by medical treatment—and reaches the following conclusions: (1) castration is an almost certain cure for osteomalacia; (2) castration should only be practiced when all other treatments have been tried in vain or when the condition of the patient is such that a prolonged medical treatment can no longer be borne; (3) castration is warranted without previous medical treatment when there is progressive puerperal osteomalacia and it is desired to render a future pregnancy impossible; (4) in Cæsarian section on account of osteomalacia it is necessary to remove the ovaries whether the uterus be removed or not.

[The writers do not mention the arguments and case-reports of Petrone and Latzko, which seem to show that in some cases the disease is cured by the action of the anæsthetic (perhaps in connection with some micro-organism) rather than by the particular operation employed.—C. and F.]

Osteitis Deformans.

Gilles de la Tourette and Marinesco⁴⁵²_{No. 4, '96} made autopsies in two cases of the osteitis deformans of Paget and found lesions of the posterior cords not suspected during life. In the first case the marrow, when hardened in Müller's fluid, presented to the naked eye a pale-yellow stain in the region of these cords, quite distinct from the deeper color of the white substance. This alteration was especially marked in the dorsal region, but not so in the lumbar region, the median radicular zone being uninvolved throughout. The staining was less marked near the median posterior groove. Microscopical examination showed the alterations much more distinctly. In sections stained with picrocarmine or by the Weigert-Pal method, but slight rarefaction of the nerve-fibres, with some thickening of the supporting tissue, could be observed in the posterior cords, while the myelin-fibres were more scattered in the regions of these cords bordering on the posterior groove and the posterior radicular zone; there was, however, no true sclerosis of these cords. Many of the myelin-fibres of the regions which appeared diseased macroscopically could not be fixed in an intensive manner by chromo-hæmatoxylin. The cervical region of the cord and the peripheral nerves were not examined in the first case, but

in the second this gap was filled; and examination showed a considerable increase in the size of the peripheral nerves,—the left sciatic, for instance, measured eighteen millimetres at the level of the buttock. This lesion was found by microscopical examination to depend upon proliferation of the connective tissue of the lamellar sheaths and of the infra-fascicular tissue (periendoneuritis).

These changes, met with in two consecutive cases, appear therefore to belong to the osteitis deformans of Paget. Going deeper into the intimacy of the process, the authors remarked that the fibres of the posterior roots were intact. The medullary change probably was due to a lesion endogenous in origin; but what was this lesion? Circumscribed in certain portions of the posterior columns, it did not appear to be a true sclerosis, although the interstitial tissue and the neuroglia had undergone slight proliferation. Examination under a high-power lens showed numerous fine fibres in the median portion of the posterior cord adjoining the posterior groove. Was this the result of atrophy of these nervous fibres? As to the relations between these lesions of the nervous system and the osseous alterations of Paget's disease, the authors advance the hypothesis that the latter were trophic disturbances depending on the medullary lesions.

Blanc ²²⁸_{Mar. 15, '95} observed a case of Paget's disease of the bones in a young man of 17 years, beginning two years before and following a progressive course. The classical deformities described by authors were limited to the tibiæ, forearms, and lower fourth of left humerus. The age of the patient was exceptional, cases being only recorded in adults and old people; and, as there had been two recent and distinct attacks affecting the knees, the author believes that Paget's disease is only a manifestation of rheumatism.

Tumors of the Bones.

Exostosis.—L. Dor ¹⁰⁴³_{p. 13, '95} found in a periosteal serous effusion a polymorphous microbe of a lemon color, waxy in consistence, and liquefying but slowly in gelatin. Dor calls it the bacillus cereus citreus, and by injecting it into the veins of rabbits in pure cultures he was able to produce albuminous periostitis once and infectious non-suppurating osteitis once, the latter characterized by bending inward of the humerus, ulna, and radius, with hyperostosis and large exostosis of these bones. There thus exists, independent of albuminous periostitis, as well as of hyperostoses or exostoses of tuberculous or osteomyelitic origin, an idiopathic form of these affections produced by a special microbe. This is perhaps what authors have designated as pseudorheumatismal.

Sarcoma.—A case of primary osteitis of sarcomatous origin,

with chronic relapsing fever, is recorded by Hammer.²⁰_{B.187,II.2} The patient was 41 years of age, and had complained for a couple of years of pains in the head, vertebral column, and chest, with relapsing fever. A diagnosis of chronic relapsing fever, with pseudo-leukæmia or new growths in the vertebræ was made. Autopsy showed that most of the bones (skull, vertebræ, ribs) were diseased, which no longer retained their normal structure, but were made up of rounded cells with little intercellular substance. In some places the latter was entirely replaced by fibrillary tissue containing fusiform cells. There were, in addition, bony tumors of similar structure in the cerebral and spinal dura mater and the pleura.

A case of concurrent sarcoma and hip-joint disease is recorded by J. Torrance Rugh, of Philadelphia,⁵_{July, '96} who remarks that the co-existence of two active diseases in the same part has been denied by some authors, but admitted by others as a rare occurrence. The doubt which first existed as to the true condition in the case described was rather increased by this fact, but the clinical history and the examination indubitably proved that such co-existence is possible. The case reported is especially interesting on account of its well-marked clinical features and its rarity, for, while there is no hindrance to the development of a sarcoma at the site of a hip-joint disease, yet such a condition has seldom, if ever, been reported.

Schwartz⁴¹⁹_{p.829,'94}⁸¹⁴_{July 1, '96} reports a case of tumor of the knee which in its history and symptoms closely resembles a tuberculous arthritis, and not until the joint was opened in proceeding to resection was it clear that the condition was really one of sarcoma of the condyles of the femur. The lower end of the bone was removed with curette and cautery as thoroughly as possible, and the tibia secured to the lower end of the femur. Non-union followed, but firm union was finally secured by electrolysis. The patient was walking about without a cane and with no sign of return seven months after the operation.

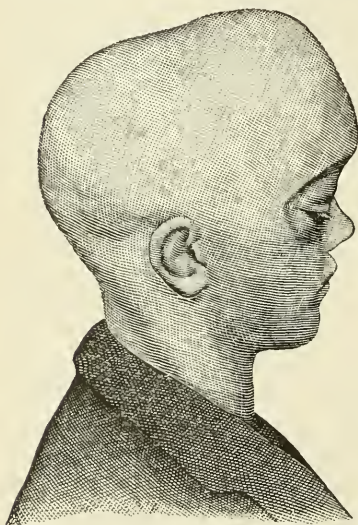
Albert⁵⁷_{p.2,'96} reports three cases of pulsating sarcomata of the humerus, three of the upper end of the tibia, and four of the innominate bone. All the cases were in men, usually advanced in life. The great danger in these cases lies in their close resemblance to aneurisms. The results were always fatal.

Duplay, of Paris,³⁵_{Dec.7,'96} records a case of spontaneous fracture from osteosarcoma. D'Arcy Power showed to the London Pathological Society²_{Feb.23,'96} a specimen of giant-celled, primary, endosteal sarcoma involving the whole substance of the patella, the articular cartilage being intact.

Heurtaux, of Nantes,¹⁴_{Feb.24,'96} performed resection in a case of

round-celled sarcoma of the upper half of the left humerus, the recovery being maintained up to the time of report,—eleven years.

R. W. Parker, of London, ²_{Nov. 2, '96} read the sequel to a case of removal of the patella for primary sarcoma. The patient, a girl aged 13, was shown to the London Clinical Society after the operation, nearly seven years ago. ²⁰⁸⁹_{v. 20, p. 254} The growth was intimately connected with the patella, which was removed. The girl recovered with a stiff joint, and remained well for three years. Then a slight local recurrence took place in the scar, which was excised, after which the girl remained well for a further period of three years. Then some new growth occurred in the lymphatic glands deep in the pelvis. An attempt was made to remove them, but was only partially successful. The girl died after some weeks, from exhaustion.



LEONTIASIS OSSIUM. (HORSLEY.)

Practitioner.

Cancer.—John Lindsay Steven and J. R. McCheyne Miller, of Glasgow, ²¹³_{May, '95} report an autopsy at which were found a tumor of the seventh right rib, an area of consolidation of the right lung, and a bulky tumor of the left ilium. These growths were examined microscopically and were all cancerous in character. The nodule in the lung is considered secondary, and the tumors of the bones the primary formation, for the following reasons: The size of the tumor is much less than is usually the case in cancers of the lung. The tumor was situated

on the lateral surface of the lung,—an unusual site for primary cancer of the lung. The tumor of the lung was in immediate relationship to the costal tumor, suggesting a direct extension from the rib. The microscope revealed occasionally a close relationship of the cancer-elements to the perivascular lymphatic spaces of the pulmonary arteries, suggesting an embolic rather than a primary origination in the lung.

Leontiasis Ossium.—Victor Horsley ¹⁵_{July, '96} records four cases in which he operated for the relief of leontiasis ossium, and concludes, from his experience of them, that there is in this disease a pathological entity in which both osteoplastic and osteoclastic processes are represented, and that, though it is a hopeless condition,

extirpation, if extensively practiced, may offer considerable relief. A fifth case was not operated on. In all five cases the disease began in childhood or early youth. In three cases the region of the external frontal process was the focus of the malady. In no case was there any evidence of syphilis, nor any really direct history of traumatism. In all the prominent symptom was pain. The operation consisted in a removal—piecemeal—of the disease, starting from the border of conjunction with healthy bone.

Tuberculosis.

Pathology.—In an anatomico-pathological study based upon 305 cases in the clinic of Ollier, of Lyons, G. Mondan⁹²_{Sept. 10, '94} gives a comprehensive glance at the localization of tuberculosis in the different bones of the foot. The lesions are usually central, though in a few cases they were observed to be both central and peripheral. A sequestrum was found in 54 cases and was absent in 20. Infiltration is the more common form than caseous fungous lesions, although the pathological types are numerous. From the onset, one principal class may be pointed out,—viz., primary lesions of the metatarsal bones and the phalanges. They are characteristic from the fact that they remain localized and do not involve the foot any beyond Lisfranc's line. The predominance of tuberculosis of the first metatarsal, which is in relation only with the first cuneiform, explains why the anterior tarsus is not more frequently implicated. In these cases a limited intervention will bring about recovery. The same is not the case with the second and third metatarsal bones, although they are but rarely invaded by the disease; still, if it gain their posterior extremity, it may be propagated to the cuneiform articulation and thus affect the whole of the anterior tarsus. The fourth and fifth metatarsals are, on account of their position, more exposed to traumatism, and tuberculous lesions are therefore more frequently observed; but they also have no tendency to spread, owing to the circumscribed synovial membrane.

[Whatever may be the theoretical consideration in these cases, it has been clinically established that extensive resections which go wide of the diseased area give the best results. It should be understood that it is better to remove too much bone than too little, although the removal of a comparatively small amount occasionally results in cure. There is wisdom perhaps in considering the tarsus as made up of one bone instead of many.—C. and F.]

Tuberculosis of the anterior tarsus may originate in primary disease of one of the cuneiform, cuboid, or scaphoid bones, and

more rare of the metatarsal. Ollier has obtained a definite cure in such cases by total anterior tarsectomy. Calcanean lesions have a tendency in their turn to remain isolated; exceptionally the cuboid or the astragalus is affected. Whatever the mode of propagation, it is certain that tibio-tarsal arthritis may result in primary tuberculosis of the calcaneum. The extirpation of the two bones becomes necessary in such cases. The author is strongly of the opinion that resection may be of the greatest value in these cases, in which, a few years ago, amputation or complete abstinence was the rule.

Félizet¹⁴_{July 7, '95} examined into the frequency of tuberculosis of the bone-marrow from his experience among cases in children. Of 150 cases of joint tuberculosis he found it in but 8 cases, and of the 150 but 2 required an amputation.

Tuberculosis by inoculation is illustrated by a striking case reported by Félix Lejars, of Paris.¹⁰⁵¹_{July, '95} A healthy young girl of 16 years pricked herself in the right hand in October, 1893. This was the beginning of a series of severe local symptoms extending to the entire member, lasting several months, and leaving after them a fistulous track and three areas of tuberculous osteitis of the metacarpal bones. Soon after two other tuberculous areas appeared in the left humerus. Several operations caused recovery of the arm and hand, but visceral complications ensued in the shape of a progressive nephritis which ended fatally in two months. The lungs showed indemnity from tuberculosis until the end.

Diagnosis.—The click of polished bone-surfaces is pointed out by C. Fenger, of Chicago,⁹⁶_{Dec., '95} as aiding in the diagnosis of osteotuberculosis of joints with large sequestra. He states that, since the introduction of the iodoform-emulsion injection by von Bruns in the treatment of tuberculous abscesses and tuberculosis of joints, excisions of joints have, fortunately, become comparatively rare. The marvelous effect of the iodoform emulsion to bring the tuberculosis to an end has not only saved many lives by the avoidance of the secondary infection which so often follows excision, but has also saved all the bone remaining in the tuberculous joint, and has thus given functional results far superior to those following excision. In consequence of this, it is only the severest cases of articular osteotuberculosis which do not respond to the iodoform-emulsion injection, and in which resection finally becomes the operation of last resort. In the hip-joint, especially in adults, the prognosis is so grave that resection is very reluctantly resorted to. There are, however, cases in which the iodoform-emulsion injection can be of no use; these are the cases in which extensive

primary osteotuberculosis has led to the formation of large tuberculous sequestra. In this class of cases the fate of the patient depends upon operation at the earliest possible moment when the diagnosis can be made. Not only does the tuberculous osteomyelitis extend into and destroy large territories of bone or perforate through the acetabulum into the pelvis, but there is also greater liability to general tuberculosis in this severe class of cases.

[The author is perhaps somewhat oversanguine regarding injections of iodoform, but their value in many cases is undoubted. Much more time is often required to obtain beneficial results than is usually recognized, it being occasionally necessary to continue the injections for many months, as in a case successfully treated by the writer.—F.]

In connection with the above cases Fenger alludes to a sign—namely, the click of polished bone-surfaces—which enabled him to make a positive diagnosis in one case. While the patient was being anæsthetized with ether the usual nervous tremor occurred, and a sound could now be heard all around the operating-table resembling the chattering of teeth, or the noise made by sliding a stick along the palings of a fence, or a cane in the spokes of a wheel in motion, or a woodpecker in a tree, as those surrounding the table variously described it. When the femur was moved with the hand a similar crepitation was heard, as when two eburnated surfaces are pushed together,—a sound like the click of billiard-balls.

This sound was suggestive of the presence of large, eburnated, polished, opposing bone-surfaces, which signified large, embolic, polished sequestra both of the head of the femur and of the acetabulum.

[Most surgeons, of course, have at times noticed the “click” referred to, but perhaps failed to give to it its full importance.—C. and F.]

The diagnosis of acute joint tuberculosis is discussed by A. G. Miller, of Edinburgh. ³⁶_{Feb., '96} who gives the following group of symptoms as characteristic and as distinguishing it from septic and gonorrhœal arthritis and from acute rheumatic synovitis: The disease may follow an injury, an operation elsewhere, or it may be incident to general tuberculosis. There will be a family or personal history of tuberculosis. The onset will be sudden, the pain not very severe and worse at night. The temperature will be high and irregular and of a hectic type. There will be sweating and rapid prostration. The affected limb will show rapid and great muscular atrophy, especially of the extensor muscles. One joint usually will be affected. There will be rapid involvement of all

the tissues of the joint, accompanied by lateral movement and grating. The joint will contain thin, flaky pus, and treatment should be amputation or excision.

A. J. Gillette, of St. Paul, Minn., ¹_{Feb. 2, '95} points out that such a large proportion of joints are tuberculous that there may be a tendency to make a diagnosis of that kind in order to be on the safe side. He refers to the possibility of mistaking osteosarcoma for hip-joint disease, and then narrates a rather remarkable case in which, after a consultation and a most careful examination under chloroform, osteosarcoma of the hip-joint was diagnosed. Some time later, however, it was found to be a deep-seated abscess in the pelvis.

D'Arcy Power ²_{v. 2, p. 412, '94}; ⁵_{Apr., '95} calls attention to the importance of bursal enlargements in the neighborhood of the hip-joint in children. Such cases at the time show no evidence of affection of the joint. There is no limp, no pain, no muscular fixation, and the head of the bone moves freely in the acetabulum. Yet such bursal enlargements are of very serious import and are of great diagnostic value, for they frequently are the first indications of tuberculous mischief occurring in a patient who otherwise appears sound. The tuberculous trouble thus starting in the bursa will spread rapidly to the joint, unless care be taken to prevent it. In support of this six cases are reported, taken from the records of the Victoria Hospital for Children during the current year. If so many cases have come under the observation of a single surgeon in a comparatively short time, the author believes they cannot be of infrequent occurrence, but very little reference to the condition can be found in most text-books.

Treatment.—Le Dentu, of Paris, ¹⁴_{June 30, '95} states that he has previously recorded two cases of fungous arthritis of the knee in which the tuberculous process invaded the entire medullary canal of the femur. He has since seen several new cases, which he described to the Société de Chirurgie. One of these cases necessitated disarticulation of the hip, the diagnosis of tuberculosis of the bone-marrow being confirmed by inoculations from the upper part of the femur. Le Dentu asked, therefore, whether in certain cases recovery would not be more assured by disarticulation of the hip. Two instances thus treated by him had resulted in cure. He added, apropos of the operation, that he had practiced it in three cases of osteosarcoma. In two of these death supervened rapidly, in the third in about three months. As regards operative technique, he had employed single-flap disarticulation three times and the method of two flaps twice, the latter seeming to him preferable if the precaution be taken to gather up in a suture the

muscles of the posterior region, in order to avoid the formation of an abscess-cavity.

Quénu believed that tuberculosis of the bone-marrow was common enough, but it seemed to him that it might be combated without resorting to disarticulation. Resection was sufficient if followed by curetting of the medullary canal. He had treated a case in this manner with complete success.

Championnière stated that he had performed a great many resections and often cleaned out the medullary canal,—a simple procedure. His patients had recovered without any complication, such as fistula or necrosis. He did not, therefore, see the necessity of so radical an operation as disarticulation, resection being sufficient.

Le Dentu could not look at the question as being as simple as it was apparently regarded. In the presence of an articular tuberculosis it appeared to him to be necessary to ascertain if the marrow were invaded, and it would be useful to know what the future results would be when the medullary canal had been cured. For his part, he had not seen recovery follow so rapidly as Championnière claimed.

[Most surgeons will agree that sufficient evidence has not been produced to show that amputation of the entire extremity is indicated in tuberculosis of the femoral marrow, especially as the diagnosis is often difficult and uncertain.—C. and F.]

Herbing³⁰¹_{B.32,H.4,5} states that Schmidt has performed 53 resections of the knee at the Stettin Hospital within six years, without any death from the operation, 13 of the patients dying ultimately from tuberculosis. The surviving cases recovered so completely as to form a strong argument in favor of this operation. The following technique was employed: Transverse incision, section, or ablation of the patella, which it is useless to preserve, since bony union is especially desired; section of the ligaments and extirpation of the capsule; finally, resection of the bony extremities with a saw; emptying of the diseased bone-areas with a curette or gouge; no suture of bone; iodoform-gauze tampons, without immediate reunion, thus combining the advantages of resection with the iodoform treatment; tight iodoform dressing and plaster apparatus for limb, the latter to be changed in three months. When consolidation has been obtained, only a supporting apparatus for the knee, of leather, is necessary. This is not to be abandoned until the patient has passed the age of 20 years.

[Resection of the patella, together with the overlying skin, by an elliptical incision passing above and below it, as recommended by Miller, of Edinburgh, has the advantage of at once removing

much diseased tissue which might otherwise give trouble.—C. and F.]

According to T. F. Prewitt, of St. Louis, ⁸⁶_{Oct., '95} resection can be justifiable only in exceptional cases of tubercular arthritis, and these will diminish in number in proportion as conservative treatment can be thoroughly carried out. For the injection of iodoform in the hip-joint, the limb should be extended, slightly adducted, and rotated inwardly. The long trocar, inserted just above trochanter major, should be pushed until it comes in contact with the head of the bone. The best points for the wrist, just below the styloid process of radius and ulna; for the elbow, the head of radius, and, for the shoulder, externally to the coracoid process, just outside the spot where the spine of the scapula becomes continuous with the acromion.

An important discussion followed the reading of a paper by Newton M. Shaffer, of New York, ⁸¹⁴_{Nov. 15, '95} in which he stated that his results after adopting the plan of opening every chronic tubercular abscess had not been so good as since he had followed the plan of non-operative interference. He had come to adopt careful and efficient mechanical support in the hope that the actual disease would cease before the opening of the abscess. His plan is to wait until there are several general or local symptoms due to the abscess itself, before resorting to incision of the abscess. He found that many abscesses disappeared, and few, if any, gave rise to trouble, and those which opened spontaneously uniformly did well. In the adult and adolescent an invariably favorable prognosis can be given, if the non-operative method be adopted, together with efficient mechanical treatment; whereas the prognosis is not so favorable if the abscess be operated upon. It has been proved by John Dane, of Boston, and others that the contents of these abscesses are sterile. Why, then, he asks, open an abscess and run the risk of infecting it? If one properly protect the joint the probability is that the urgent symptoms will subside; and if one get the patient up and about in the open air the constitutional disturbances will probably be subdued. If, however, the urgent symptoms persist, a free incision must be made. Ordinarily, if such an abscess must open, it should be allowed to open spontaneously. The ultimate recovery of the joint is better under the non-operative treatment than under incision of the abscess. Shaffer has learned under ordinary circumstances to have no fear of the "burrowing" of abscesses. His treatment at the New York Orthopædic Hospital consisted in continuous mechanical protection by the long hip-splint, the antero-posterior splint, and the immobilizing and traction apparatus in knee-joint disease. In

addition to this the usual constitutional remedies were employed, and when the symptoms were acute the patients were kept in bed for a time. Simple external dressings were usually employed, and the parts kept clean with peroxide of hydrogen or bichloride of mercury. The total number of cases of abscess admitted to the hospital during the past five years is 35, and Shaffer has appended to his paper the detailed histories of these cases. Out of these 35, 27 remained under the care of the institution for a sufficient length of time to test the value of the treatment. Of these 27, 6 underwent complete absorption; in 2 a very large double ilio-femoral abscess was present. Out of 8 abscesses present in these 6 cases, 2 were absorbed in one year, 1 in eighteen months, 1 in fifteen months, and the others in three years. Fifteen of the abscesses, after opening spontaneously, closed completely in periods varying from two to twenty-one months. Of the 27 cases, 5 still present small discharging sinuses.

[Whether to open tubercular abscesses or to let them alone has given rise to much discussion. Before the days of cleanly surgery there is no question that the latter procedure was preferable. At present a medium course seems best. It appears to be advisable not to open these abscesses unless there is some good reason for doing so,—pain, pressure symptoms, etc. If the abscess is of such a character that it can be eradicated together with its cause, an operation would be in place, as it would also if the abscess were about to open spontaneously, for in spite of contrary opinions it seems reasonable to suppose that in the interest of asepsis this would be the preferable procedure. A mixed infection with more or less acute symptoms would certainly be an indication for immediate incision.—C. and F.]

When the abscess is small or where it is large and does not interfere with the satisfactory application of protection apparatus, V. P. Gibney ⁸¹⁴_{Nov. 15, '95} states that the case may be simply watched. If the abscess is undergoing absorption we should not, in the opinion of Shaffer, interfere; but if, on the other hand, we find it becoming larger and changing to a pyogenic abscess, it is our duty to aspirate the abscess a few times. If this is not sufficient we should make free incision and endeavor to reach the source of the abscess. If it be a psoas-abscess we can very often reach bits of bone with a long curette and pack the abscess-cavity well. Of course, this means a long period of patient, careful, aseptic dressing. If the abscess is in the way of our using proper mechanical treatment, it is obviously our duty to get rid of the abscess as soon as possible. The most difficult variety of abscess to treat is where there are already sinuses in various directions. Some sur-

geons treat these cases by scraping and endeavoring to get healing from the bottom. Strangely enough, some of these cases of chronic tubercular abscess, after resisting the best treatment in hospitals, will return to filthy homes and recover quite rapidly. Gibney at first followed the traditions of the naval medical service and the authorities of the day, in beginning his studies in this direction some twenty years ago, and made early and free incisions; but he was led to change his method, and for several years has not seen, and does not expect to see, abscesses of this kind that require opening or any local treatment beyond a simple dressing.

Samuel Ketch stated that cases of so-called "cold abscess" presenting no symptoms should be left alone, for it is well known that many of them disappear entirely. Concerning those which present an acute or subacute character, there can be no question about the advisability of opening them.

John Dane, of Boston, asked whether it may not be that those abscesses which do not disappear are instances of mixed infection. We certainly find that cultures from such cases show pyogenic germs. He has followed many cases of abscess in the Children's Hospital during the past year, to see if there were any connection between the count of leucocytes and the bacteriological culture of such abscesses as were opened. The result seemed to be that a mixed infection would show itself very early by the count of leucocytes, and when that abscess was opened, whether early or late, the leucocyte count would be a good guide to what was going on in the abscess.

John A. Wyeth remarked that modern pathology holds that a tuberculous abscess does not contain true pus. While in gross appearance it resembles pus, the microscope shows that the normal elements of pus do not exist. Under favorable conditions these collections of tuberculous fluid tend to absorption. In the majority of instances the wall of embryonic cells offers sufficient resistance to invasion of the tuberculous germs into the general system. The liquid is absorbed ultimately and carried away as a harmless product, and the remaining caseous matter undergoes granular metamorphosis and of itself ultimately disappears. When these tubercular cavities are left to themselves the surrounding tissue is destroyed. He could cite a great many cases of similar character, showing more or less serious results from prolonged mechanical treatment without operative interference. In twenty cases of hip-joint disease he had found the head of the bone separated from the neck and had removed it as a foreign body. In sixty-five cases of excision of the knee-joint for disease he had found the shaft of the bone diseased for a long distance from the joint.

It is time to operate when the capsule of the joint is ruptured or where there is a rapid myelitis or where abscesses may burrow into important structures. One should always operate when there is necrotic bone present, and for this reason Wyeth thinks the exploratory incision should be made to determine the presence of this condition.

Shaffer, in closing the discussion, said that he wished to draw a very distinct line between the acute burrowing of a pyogenic abscess and the chronic burrowing of a tubercular abscess. In several of the cases reported upon he felt disposed to operate, but refrained because he had determined to carry out this non-operative method in all his cases during a certain period. A quicker and better result, he believed, would be obtained if one were content, in 80 or 90 per cent. of the cases, to wait, watch, and study.

Rydygier, of Krakow, ⁵⁶⁹_{No. 10, '96} contributed the following propositions: 1. That conservative treatment should not be looked upon as a competitor of operative treatment; on the contrary, one should be the complement of the other. 2. The treatment chosen in a given case should depend on the social position of the patient, his age, general state of health, local changes, and on the joint affected. 3. If there is distinct suppuration of the joint, with inclination to spread and destroy the joint, it is necessary to operate. 4. The better the method of conservative treatment, the more we can limit the operation. 5. The best method of conservative treatment is that which permits the patient to profit by fresh air and movements such as will not expose the joint to irritation. 6. The best method of conservative treatment is that which best permits of the removal of the morbidly degenerated parts without any special regard to later action of the joint; in some cases, however, the complete removal of the joint is advisable. 7. Operations performed too late increase the statistics of conservative treatment, but are not advantageous to the patient, while too early operations only injure unnecessarily. 8. In addition to local treatment, sea-air and suitable baths are recommended as general treatment. (Report of Corresponding Editor Drzewiecki, Warsaw.)

E. Wieland ³⁰¹_{B. 41, H. 4, 5, '96} states that iodoform injections have been used in most cases of surgical tuberculosis at the Clinic for Sick Children in Basel. A 10-per-cent. iodoform glycerin has generally been employed, but for some time past the glycerin has been replaced by olive-oil, which can be more certainly sterilized. The amount of either vehicle injected varies from 20 to 50 cubic centimetres. The abscess is evacuated and the cavity washed out with 4-per-cent. boric-acid solution before making the injection.

If the abscess refill after a time, another injection is made. Formerly operation was performed when recovery did not follow two or three injections, but now the iodoform treatment is persisted in as long as possible. An important aid to the method is compression by means of a flannel bandage. Wieland also insists on the value of rest of the diseased limb during the whole time of treatment.

[Others have obtained good results by permitting a certain amount of motion, even claiming that motion hastens the curative process. If movement does not materially interfere with recovery, it would certainly be of advantage in some cases when it is desirable to avoid complete ankylosis.—C. and F.]

König, of Göttingen, ²²⁶_{B.50, H.12, '95}; ⁸¹⁴_{Nov.15} reviews his experience in 615 cases of joint tuberculosis. Twenty-seven per cent. were treated conservatively. Injections of carbolic acid gave him better results than iodoform injections. In over 20 per cent. of the conservative cases movable joints were obtained. In 24 per cent., mainly children, arthrectomy was performed, with 79 per cent. of cures; a large proportion of the cured cases had arrest in growth. In almost 47 per cent. of the cases resection was done, with 68 per cent. of cures. In 91 cases amputation was performed. König considers this operation proper if there is no hope of retaining a movable joint.

[Such a statement is certainly rather too sweeping. While it is true that amputation might be performed more frequently with benefit to the patient, nevertheless ankylosed joints are often far preferable to artificial limbs. A stiff elbow frequently admits of a very useful arm, and a stiff knee may not be inconsistent with much activity on the part of its possessor.—C. and F.]

S. H. Weeks, of Portland, Me., ⁹⁹_{Aug.22, '95} recommends iodoform injections, fixation by plaster of Paris or splints, and traction to overcome muscular spasm. Excision is a last resort, after a faithful trial of mechanical measures.

From 1398 cases J. Rabl, of Bad Hall, ⁸_{Jan.10, '95} comes to the following conclusions: 1. More cases are cured by strict conservative treatment of joints than by operations. 2. Mortality is less. 3. Functional results are better. Rabl claims priority for iodoform injections, which was advanced by Bruns in 1881 and first comprehensively described by Mikulicz as ninety cases published from Billroth's clinic in 1884.

Bonome of Rome, ³_{Nov.18, '95} has successfully employed a 20-per-cent. oily solution of guaiacol in the treatment of surgical tuberculosis, injecting it into the diseased area itself as well as in the vicinity. He has also applied it directly to the bone, laying bare the epiphysis by means of two lateral or one median incision,

making a series of perforations throughout the entire thickness of the bone, and introducing sponges soaked in guaiacol, changing them every day and then every two days. He has also injected the same solution into the periarticular tissue and into intra-articular fungosities. The maximum quantity injected at one sitting was 10 cubic centimetres, not including that used on the sponges. The remedy was always well borne.

Bier⁴⁷⁵_{Nov., '96; Dec. 21} encourages a chronic congestion of the affected structures by firm and prolonged constriction of the limb on the proximal side, experience in fifty-two cases of disease of the knee and wrist having convinced him that it is one of the most effectual means of dealing with this disease. It is capable, he states, of restoring, in the course of a few days, the function of a painful and crippled joint, and is preferable to other conservative methods,—such as rest and the local use of iodoform,—with which, however, it may be associated. At the same time he acknowledges that this is not a universal cure in cases of tuberculosis, and that it has its drawbacks and failures. Much stress is laid on the necessity, during this treatment, of an early recognition and a strict antiseptic treatment of cold abscesses.

[It should be noted that, although the results of Bier's "chronic-congestion treatment" have been, on the whole, encouraging, a number of other experimenters—for instance, Zeller, of Berlin—have not been so successful. The method has not been so universally adopted as has the injection of emulsions of iodoform.—C. and F.]

Horace Manchester Brown, of Milwaukee,⁴⁵¹_{May, '96} concludes that an attempt should always be made to bring about progressive metamorphosis of tissue by injections of iodoform emulsions, either in glycerin or ether, when the progress of the disease has not been so great as to indicate that the intra-capsular tissues are entirely destroyed. Arthrectomy and arthrotomy are contra-indicated in cases where excessive emaciation and extreme anæmia or the occurrence of foci of tuberculous disease in distant organs indicate that there is a general condition of tuberculosis. Arthrectomy or arthrotomy is indicated when the disease seems to be limited to the joint or the peri-capsular tissues, and when the patient's condition is such that it is safe to believe that the shock of the operation can be withstood. Great care is to be exercised in attempting to break up an ankylosis, lest the disease, not entirely eradicated, be started anew or new fracture be produced. Amputation is indicated when the disease shows no tendency to local improvement and the progress of the disease is rapid and unmanageable, as in the liquefying form of tuberculosis.

Finotti,^{301 814}
B.60,II.5,6; Oct.1,'95 reports forty cases of tuberculosis of the os calcis from Nicoladoni's clinic and reaches the conclusion that the prognosis is better in this than in the other tarsal bones because the disease is more likely to remain limited. Involvement of the tendon-sheaths does not render the prognosis bad, although it demands very radical treatment; but, if the disease has followed along them into the sole, amputation is the only suitable method. If resection is attempted in the adult, it will be necessary to remove the entire bone, but in children a curetting will answer. Even entire removal of the bone does not disable the patient, as he can walk with a support for the heel.

Infective and tubercular osteitis as causes of arthritis in childhood, and the importance of their early treatment, formed the subject of the Bradshaw Lecture given by N. C. McNamara, of London.⁶
Dec.7,'95

A review of the subject of tubercular arthritis was given by J. E. Moore, of Minneapolis.¹⁰⁵
July 1,'95

Suppurative Arthritis.

Mauclore, of Paris,^{360 2}
Feb.,'95; Mar.16 in an article on suppurative arthritis in infective disease, deals with the following cases: 1. Acute rheumatism. Pyarthrosis has been reported, but it is probable that the suppuration was due to a secondary infection. True articular rheumatism must be distinguished from the *pseudo* variety. 2. Pseudorheumatism. In this class the author places cases in which the joint affection is the first local manifestation of the general infection. Sometimes these infections are intense and the lesion multiarticular; sometimes less intense, only one joint being involved; or the infection may be very attenuated, the joint lesion being periarticular in character. In this group should be placed the suppurative arthritis sometimes seen in the first few years of life without previous illness. Acute articular rheumatism, epiphyseal osteomyelitis, tubercle, and syphilis must be excluded. Usually one joint is affected. The prognosis is favorable in these children under proper treatment. Suppuration in the pleura and pericardium has, however, been noted. 3. Gonorrhœa. The author says that at the present time it is difficult to say whether the distant lesion is due to the gonococcus, toxins, or a secondary infection. Sometimes the general manifestations of gonorrhœa are slight; sometimes they may be severe, resembling typhoid fever. The lymphatic system plays an important part in propagating the disease. These joint affections have by some been attributed even to a spinal-cord lesion. Suppurative arthritis occurs in the acute stage of gonorrhœa, but sometimes later in neglected cases.

Felix Franke²²⁶ ⁴⁵¹_{B.49,H.3,'95; Sept.} calls attention to a new form of infective inflammation which he has observed subsequent to attacks of influenza and of which he reports in detail twenty cases. The most frequent form is an osteitis or osteoperiostitis which may go on to suppuration or may produce simple local swelling and œdema and be followed by resolution. Like all the other manifestations, it can only be diagnosed by its proximity to an attack of influenza or by the presence of symptoms of that disease concurrently with it. When any of these inflammations resist all treatment and go on in a chronic course of latent character, the possibility of an etiology in influenza should not be overlooked, and a history of a series of attacks or the presence of symptoms should tend to confirm the diagnosis. Osteoperiostitis is the most frequent form, and under it may be classed, according to this author, the disease described by Albert as "Achyllodynie," where the insertion of the tendo Achillis is the seat of a periostitis. The involvement of fascia is next in frequency, and chiefly an inflammation of the plantar fascia, whereby it becomes thickened without outward signs of inflammation; the thickening is usually along the inner border and at the insertions of the fascia. It is slightly sensitive to pressure and is painful to stand or walk upon for any length of time. Arthritis, having as its sole cause an infection due to influenza, is seldom seen, but does doubtless occur. The symptoms may manifest themselves three or four days after the inception of an influenza, but may be latent for even many weeks.

The resistance to all treatment is very marked; the best results are derived from the applications of moist heat and massage, with incision and drainage in cases that go on to suppuration. The salicylates have been of no avail, as, also, all ointments and counter-irritation, except, perhaps, in certain cases, ichthyol.

[Influenza being so prevalent a disorder, it may occur in connection with any joint-lesion as a mere coincidence, and this should be carefully excluded in every case before drawing any positive conclusions as to cause and effect.—C. and F.]

H. Meunier, of Paris,³⁶⁰_{Nov., '94} observed a case of arthritis following pneumonia, in which bacteriological examination showed the presence of a mixed infection due to the combined action of the pneumococcus and the streptococcus. The case shows the necessity of a careful bacteriological examination of the effusion in an articular affection occurring in the course of or consecutive to pneumonia.

Kirmisson⁸⁵³ ⁹⁹_{Nov., '94; Feb.14, '95} described a method of treatment which at one time was attempted, but, on account of the unfortunate results,

has never been received with favor, as in most cases the point of puncture became infected and the arthritis became acute, which in many cases ended either in amputation or in the loss of life. Since the days of aseptic surgery this danger is avoided, and the author reports several cases in which the method has been employed with favorable results. In the treatment of these the skin is thoroughly cleansed in the same manner as would be the case if an ordinary operation were to be performed, and the fine point of the cautery, heated to a red heat, is inserted along the point of the greatest development of the granulations. From twelve to eighteen punctures are made and the diseased portion is in this way thoroughly reached. The part is then filled with iodoform gauze, the limb incased in plaster, and a certain amount of compression used. He reports several cases in which the results were very satisfactory. At the time of writing there were a number of cases where the puncture was used, and the recovery was rapid considering the ordinary length of time of these cases of arthritis which are not opened. It is recommended on account of its easy accomplishment and being within the reach of most practitioners.

Hydrarthrosis.

Intermittent hydrarthrosis is a rare and little-known disease, Chauvet, of Lyons, ²¹¹_{Sept 22, '95} who reports a case of his own, being able to collect only fourteen similar ones from medical literature. These cases were equally divided as to sex, the age varying from 17 to 49 years. The affection was most frequent in the knee, and more rarely in the elbow, hip, and tibio-tarsal joint. The antecedent history of the patients showed nothing special, though sometimes malaria, labor, or traumatism was noted. In the majority the hydrarthrosis appeared at regular intervals, varying from one to three weeks in different individuals. The various therapeutic measures employed gave no appreciable results. Quinine produced good effects in three cases; but as the drug failed in malarial cases, while these patients were free from malaria, it is probable that spontaneous recovery took place in these three cases. In three other cases the hydrarthrosis spontaneously disappeared during pregnancy, to re-appear after delivery. The nature of the affection is obscure. According to Chauvet, it cannot be attributed to rheumatism, arthritism, malaria, nervous affection, or to infection. He thus, by exclusion, is led to suppose that it is due to an auto-intoxication the cause of which is unknown.

G. Colonna ⁹⁹⁷_{No. 47, '94} also reports a case of intermittent hydrarthrosis.

[A number of cases of this affection have apparently been

overlooked by Chauvet; for example, in 1878 Eschricht reported nineteen cases, to which three were added by Brincken in 1889. Brincken regards the disease as bacterial in its origin and insists that it is at times controlled by the administration of large doses of arsenic.—C. and F.]

Synovitis.

The relation of the gonococcus to synovitis presenting the clinical characteristics of blennorrhagic arthritis is considered by Respighi and Burci³⁷⁶_{p.426, '94} as indubitable, its presence being demonstrated by preparations and cultures. The gonococcus is localized superficially in the synoviae and tends to disappear rapidly by involution, but the process continues by evolution of the pathological alterations which it has caused on the surface of the serous membranes, and the products of its destruction may remain active. The absence of the gonococcus, often noted, may be explained either by the time at which it was sought for or by the fact that it was limited to the free exudate.

A case of suppurating tendinous synovitis of blennorrhagic origin is recorded by Jacobi and Goldmann.⁷⁶¹_{B.12, H.3} The point of special interest is the bacteriological examination of the pus, which contained only gonococci to the exclusion of all other pyogenic microbes. Gonococci were also found, though only in small numbers, in the walls of the part of the tendinous sheath excised. This localization is exceptional and interesting, as is also the peculiar form of inflammation observed in this case.

F. de Quervain, of La Chaux-de-Fonds³_{July 10, '96} describes a peculiar form of chronic synovitis of the sheath common to the short extensor and long abductor of the thumb, which he has observed in two cases,—one in the clinic of Kocher, of Berne, and the other in private practice. The affection is distinct from crepitant synovitis observed in the same region and from the other varieties of chronic synovitis. It is not rare, since Kocher, who has given it the name of fibrous stenosing synovitis, and Sandoz have each had occasion to study several cases. Clinically it is characterized by more or less intense pain in the sheath alluded to upon motion of the thumb, irradiating throughout the forearm and sometimes preventing all manual labor.

C. Byron Turner, of Grimsby, Eng.,²_{Oct. 13, '94} observed an affection of the knee-joint which simulated dislocation of the semilunar cartilage. As the condition recurred, he opened the knee-joint over the swelling, which was attached by a pedicle to the synovial membrane lining the capsule. It was easily removed, and measured one inch in length, one-half inch in width, and from one-eighth to

one-fourth inch in thickness. Microscopical examinations showed it to be derived from the synovial fringes, gradually increasing in size at the surface, where the growth was most active and the blood-vessels were still patent, until its size caused these to be suddenly cut off.

A case of cure of tuberculous synovitis of the knee by means of injections of iodoform-oil is described by Troquart,¹⁸⁸ of Bordeaux, Dec. 22, '95.

Synovial Cysts.—Duplay, of the Hôtel-Dieu,³⁶⁰ Dec. 22, '94; Dec. 12, '95 treats synovial cysts of the wrist by injecting a few drops of tincture of iodine by means of the ordinary subcutaneous syringe. Without emptying the contents of the tumor, he injects from 6 to 10 drops of the tincture into the centre of the cysts and applies a compress bandage. Generally one operation has been sufficient, but, in certain cases, he has been obliged to renew the injections twice or three times. On the third or fourth day he removes the bandage, when the tumor is found to have considerably diminished in volume. Duplay has never seen any inflammation as a consequence of the iodine. At the end of ten days the cyst is entirely shriveled up.

Charcot's Joint Disease.

Nugent,¹⁶ No. 274; June 1, '95⁸¹⁴ describes a case of Charcot's disease in which the laxity of the knee-joint was very marked and the retroflexion so great when the patient stood on that limb that the condyles seemed about to burst through the skin. The condition of the crucial ligaments seems to have been the principal cause of this condition. At the autopsy the muscles in the neighborhood of the joint were well developed, especially the plantaris. The capsule was greatly thickened, especially on either side of the ligamentum patellæ and over the external condyle posteriorly. The external lateral ligament was somewhat thickened, but the internal was normal. The synovial membrane was much thickened and numerous little bands crossed the angle of its reflexion. Near the patella it was roughened by the projection of small pedunculated bodies. A large, tough fringe projected for half an inch between femur and tibia, and a fringe overlapped the condyles posteriorly. The lower end of the femur, the patella, and the upper end of the tibia were enlarged and presented about the same appearances; their articular cartilages were in parts eroded, the eburnated bone shining through. The margins of the articular surfaces projected abruptly and unevenly, overhanging the non-articular surfaces. Irregular bony growths projected from the upper part of the condyles posteriorly and from the anterior surface of the tibia, between

the tuberosities. The transverse ligament was well developed. The anterior crucial ligament had practically disappeared, but the posterior had only partially done so. The semilunar cartilages appeared normal. The circumference of the knee was four inches greater than its fellow. The condition followed a fall on the knee, when "something was felt to give," about eight months before his death.

A case of Charcot's joint disease is also recorded by F. Kammerer, of New York.⁹⁶
May, '95

Miscellaneous Disorders of Joints.

Diagnosis of Joint Affections.—Sir Benjamin Ward Richardson,³⁸
3d Q. '94-'95 who has made a practical study of the subject, states that auscultation is quite as useful in joint affections as it is in affections of the lungs, but that it requires to be learned in its details before it can be fully applied. Joints that are healthy must be auscultated as well as joints that are diseased, and the latter, in turn, must be auscultated and learned according to the kind of diseased condition that may be present. Distinction must also be made between the sounds that arise from the friction of bones in their sockets and upon each other. For conducting this kind of examination the double stethoscope is the best, but he sometimes uses the simple differential stethoscope, which consists of two single-mouthed tubes quite separate, the ear-pieces of which can be adapted to each ear. The mouth-piece should not be large—three-quarters of an inch in diameter is sufficient—and it is advisable to have the mouth-piece covered at its edge with India rubber, so as to avoid external friction. If the double stethoscope be not at hand the ordinary wooden instrument will suffice; but the advantage of the double one is that it enables the operator to manipulate the joint and bend it without the aid of an assistant, although the latter is always of service.

When a joint is quite healthy and the person auscultated is young, there is practically no sound or movement whatever. No sound will be heard, except a very gentle, soft, friction sound, if the movement be made in such a manner as to bring the end of the movable bone with some force into collision with the joint or bone that opposes it in the socket. When a sound is produced it may be called a cushioned sound, and it ceases the moment the action that produced it is slowly carried out without pressure. A very little derangement within the joint itself—less than a friction that produces impediment of motion, much less than an impediment that gives rise to pain—leads, however, to sounds that are distinguishable, the abnormal sounds increasing in degree as the

impediment within the joint is intensified or modified. There are, at least, five modifications of joint sounds; they may be defined as (1) simple dry friction sound, (2) dry grating sound, (3) coarse grating sound, (4) moist crepitant sound, (5) and coarse crepitant sound.

A review of the methods of diagnosis of chronic joint disease is given by W. R. Townsend, of New York. ^{May 25, '95}

Traumatic Meniscitis.—Roux, of Lausanne, ¹⁰⁸_{Dec. 1, '95} designates as "chronic traumatic meniscitis" a circumscribed inflammatory thickening of the borders of the interarticular cartilages of the knee. The disease is distinctly characteristic, resulting from contusion, sprain, and pinching of the meniscus by forced movements of the knee. It is recognized by the presence of a painful thickening between the lateral internal ligament and the edge of the patellar ligament (internal meniscus). It must not be confounded with tuberculosis, proliferating arthritis, dislocation of the meniscus, ruptures with ecchymosis, or foreign bodies with the consequent effusion. Here the patient can reproduce the accident at will, especially by hyperextension of the knee.

The best method of treatment is by massage. Patients who had been kept in bed for a long time without result were cured in several weeks by forty or fifty sittings with massage. This must include the entire limb, special efforts being made to reduce the turgescence of the meniscus.

Fibrous Ankylosis.—F. W. Gwyer, of New York, ¹_{June 8, 15, '95} reported upon some cases of fibrous ankylosis treated by electrolysis. He employs the continuous current, moderately large electrodes, and a solution of ammonium chloride. The current is passed directly through the joint, with the negative pole nearest the adhesions. The application lasts from ten to thirty minutes and is repeated every two to five days. The amount given depends on the susceptibility of the patient to pain, the condition and amount of reaction of the skin, and the size of the electrodes. It will range from 40 to 150 milliampères.

He finds that the best results from the method are obtained in cases of injury; the shorter the interval between this injury and the beginning of the galvanic treatment, the more rapid and greater the improvement, which is more manifest and rapid at the beginning of treatment than later on. All his cases of injury showed great and immediate improvement. In cases due to disease the results were slower, and in two out of five cases the method entirely failed. The improvement was marked in the direction of increased motion, lessened pain, reduced swelling, more normal circulation, and increased general usefulness of the limb.

AMPUTATIONS.

General Technique.

Wyeth, of New York, ¹_{Nov. 16, '95} described a number of modifications which he found of advantage in the technique of amputations. In Syme's amputation he modified the incision, carrying it from the tip of the malleolus on either side directly downward parallel with the axis of the leg, the foot being held at right angles to the leg. In this way the blood-supply to the flap, especially on the inner side, is not interfered with, which was often the case when the incision was carried obliquely backward as formerly advised.

[This method is not new, but is mentioned in various books,—for instance, Tillman's "Surgery."—C. and F.]

In certain cases of amputation, when osteomyelitis has prevailed, it was thought that the surgeon might be called upon to carry his amputation high up, close to the shoulder- or hip-joint, in order to get above the disease in the bone. This, in Wyeth's opinion, is not good surgery, for, the longer the limb, the more use it will be to the patient, while bones that are the seat of osteomyelitis can be readily cured, provided the canal is opened even near the knee- or elbow-joint and the bone carefully curetted up to the end of the canal. The insertion of a drainage-tube through which aseptic irrigation is made every day or two, and the gradual withdrawal of the tube, will cure the disease in the bone and leave the stump long and useful.

One other point has been of great service to Wyeth in effecting rapid amputation. When making a hip-joint amputation or an amputation through large masses of muscular tissue, after tying large arteries, such as the two femorals and the circumflex branches, and in order not to lose the time usually spent in applying forceps to oozing surfaces, he passes deep catgut sutures through great masses of muscle all the way across the whole cut surface and ties these firmly. In this way the muscles are brought together and compression exercised, which prevents bleeding. Ten or fifteen minutes can be saved by this practice in an ordinary amputation.

[In railroad crushes, where the vitality of muscles which it is desirable to endeavor to save is often much interfered with, the application of such ligatures, if they are at all snug, might cause unnecessary sloughing.—C. and F.]

An important discussion upon amputation took place at the New York Academy of Medicine in connection with a paper by John F. Erdmann, of New York, ⁹⁶_{Sept., '95} presenting the results of a

statistical study of 703 major amputations, including all cases of single amputations recorded in eight of the largest hospitals in New York during a period of ten years,—from January, 1884, to January, 1894. A mortality-rate of 15.5 per cent. being shown, Erdmann compared this rate with the mortality found in amputation cases previously collected, and concluded that the mortality of single operators is lower than in general hospitals; that, owing to ignorance of the classes that inhabit our large charity institutions, consent is not easily obtained, in a great number of cases, until an almost fatal condition is present, and as a result of this condition the mortality-rate is materially increased; that the mortality-rate in the last few years, owing to improved antiseptic and aseptic technique, has been lowered considerably; that deaths from secondary hæmorrhage have diminished in direct proportion to the perfection of our antisepsis and asepsis; that age, although a factor in the mortality-rate, does not carry with it at present the great importance of former years, and, finally, that the prognosis as to recovery from the operation in amputations for disease is much better than in cases of trauma.

In the discussion Howard Lilienthal⁵⁹_{Mar. 9, '95} stated that, of 367 cases where the flaps consisted of skin alone, 69—or 19 per cent.—sloughed in whole or in part, while, of 216 cases of musculo-cutaneous flap, only 41 sloughed,—or 19 per cent.,—showing the comparative advantage of the musculo-cutaneous flap as to vitality. The skin-flap was also found to be more easily killed by sepsis. The statistics showed, further, that constitutional disease was a frequent cause of flap-necrosis. The tendency to flap-gangrene was greatest below the knee. Musculo-cutaneous flap was to be selected wherever possible.

[As the percentage is the same in both cases it is difficult to see how the writer proves his statement.—C. and F.]

Torek had found that out of the 703 cases secondary suture had been employed in 37; in 20 of them the wound was closed in forty-eight hours; in 17, later. The former were termed early secondary suture; the latter, late secondary suture. In none of the 37 had there been death; primary union in 17, or 45 per cent. Seventy-eight per cent. united; 22 per cent. did not. Late secondary suture had not given as good results as early secondary suture, for reasons not far to see.

P. R. Bolton said that the question of whether drainage should or should not be employed must be decided in most cases by the disease or injury for which amputation was performed. It could be dispensed with in many cases of amputation for tumor; also in some cases of joint disease, trauma, etc.

C. C. Carmalt had found details with regard to the duration of the treatment in only sixty of the cases. The average stay in the hospital had been forty-two days.

S. Tousey stated that in amputations for traumatism, in cases in which the primary shock was marked, the mortality had been 40 per cent. ; where it was absent the mortality had been only 5 per cent. The inference was that the shock from the injury killed the patient.

McBurney was in accord with what had been said with regard to the value of secondary suture in decreasing the mortality. He would include it under the head of drainage. The only objection to drainage consisted in leaving it too long. If the wound were aseptic the tube ought certainly not to be left in longer than forty-eight hours, probably not longer than twenty-four hours. Much could be said with regard to shock. A loosely-attached limb could be snipped off with the scissors, the wound treated by open tampon, the patient allowed to go without further traumatism until shock was recovered from, secondary amputation being done later. He had saved several patients by pursuing this course when primary amputation would probably have ended fatally.

[The tendency of surgery is much more toward the waiting policy, in cases of shock, than it formerly was, and apparently with reason, especially if aseptic and antiseptic precautions are observed. In spite of the fact that many amputation wounds will heal without drainage, most surgeons consider it safer to employ a drainage-tube during twenty-four to forty-eight hours at least.—C. and F.]

In the speaker's opinion, many cases of shock, so called, were cases of hæmorrhage. The amount of blood lost was a matter of very great importance, and one should, at a very early period, make use of active measures to overcome its bad effect. For this purpose he had found of greatest value hot saline solution thrown into the blood-vessels. The infusion might be made before, during, or after amputation. A quart or a quart and a half of normal salt solution could thus be injected.

Regarding necrosis of flaps, L. A. Stimson had seen many cases at the Chambers Street Hospital and elsewhere in which doubt existed as to the vitality of parts through which it was proposed to amputate, and he had found the best means for determining that point to be the application of the Esmarch bandage three to five minutes. After its removal there would be a blush in the blanched healthy skin not seen in the diseased or non-vital portion. Follow the outline of the parts which had been white. The knife should be carried down close to the fascia in all skin-flaps, as it increased

the chances of survival of the flap. Loose suture and snug bandage would give all drainage required in most cases, thus doing away with the drainage-tube and with the necessity for change of dressing called for by other plans.

Robert Abbe emphasized a few points, the first being the importance of using muscle- and skin- flaps instead of skin alone wherever possible. The skin-flap sloughed because of tendency to fall in folds and because of pressure on harder parts. Another point was the value of deep-buried suture in muscle over the end of the bone. Besides, amputations through the middle of the foot did not leave a serviceable limb because of painful scars, etc., and it was better to cut through the lower third of the leg if possible, or through the lower third of the thigh,—points at which instrument-makers found it possible to apply the most serviceable artificial limb.

[Instrument-makers differ as to this,—some agreeing with Abbe, that stumps should be made to fit the artificial limbs; while others claim that they can adjust a serviceable prothetic apparatus, no matter where the limb may be divided.—C. and F.]

F. H. Markoe thought the cases divided themselves into two classes naturally,—amputation for traumatism and amputation for disease; again, into amputation for septic conditions and for non-septic conditions. In non-septic conditions amputation should be done through healthy tissues and the wound closed. By using buried suture, accurate apposition, and careful dressing he had had no occasion to regret omitting drainage. In traumatic cases he agreed with McBurney that we should cut away waste tissue and wait until after shock had passed before amputating.

F. W. Murray stated that it was very necessary in amputations to shorten anaesthesia as much as possible, and this was one important reason for using tamponade and secondary suture.

B. F. Curtis said that drainage had been practiced in over five hundred cases and omitted in only about fifty. With drainage there had been absolute primary union in 37 per cent. of the cases of amputation of the upper extremity, 33 per cent. of the inferior extremity, or 34 per cent. altogether; and primary union, including sinus, in 72 per cent. of the upper extremity, 55 per cent. of the lower extremity, or 60 per cent. altogether. Against this, without drainage, there had been absolute primary union in 60 per cent. of amputations of the upper extremity, 71 per cent. of the lower extremity,—altogether 67 per cent.; and primary union, including sinus, in 73 per cent. of amputations of the upper extremity, 77 per cent. of the lower extremity, or 76 per cent. altogether.

Curtis thought New York surgeons did not appreciate as much as they should the advantage of getting rid of drainage, since it would exclude danger of introducing sepsis with the drain and again with the second dressing. While a sinus, usually due to the drain, might not be serious, yet it was very disagreeable.

A. H. Meisenbach, of St. Louis, ⁹⁶_{Sept., '94} relates his experience with Neudorfer's method of amputating. The amputations in continuity are divided (1) through regions where there is only a single bone to be divided, as in the thigh and in the upper arm; (2) through regions where there are two bones to be divided, as in the forearm and in the leg.

When one bone only is to be divided, the first step in the operation is to determine the point at which its section is to be made. Taking, as an example, amputation of the thigh at the junction of the lower with the middle third, if the bloodless operation of Esmarch is employed, the limb is first rendered bloodless by the application of a bandage and constrictor. If this method is not employed, the vessels are controlled either by a constrictor or by the fingers of an assistant. Having determined the point where the bone is to be divided, an incision is made with a sharp-pointed, strong resection-knife, extending downward in the long axis of the limb, through the soft parts and periosteum. The incision should be made on the lateral or anterior aspect of the limb, where the bone is more superficial and where the larger vessels and nerves are avoided. In the thigh the incision should be made about twelve centimetres in length, or about four and a half inches. With large-sized retractors the soft parts are held apart. The periosteum is thoroughly loosened from the bone in the line of the incision with a raspatory. With the chisel the bone is cut through at the upper angle of the wound (line for division) as in an osteotomy. The lower fragment is luxated through the slit in the periosteum and the membrane (periosteum) carefully stripped from the bone.

The soft parts are now divided at the site of the lower angle of the wound, in one place cut transversely to the axis of the limb, with an amputating-knife, scalpel, or even with a large pair of scissors. The vessels are next secured by ligatures. Having secured the vessels, the periosteum is stitched together with a fine catgut, continuous, buried suture, both longitudinally and transversely, obliterating the cavity of the periosteum which was occupied by the bone. The muscles are now united by a continuous, buried, catgut suture, and, finally, the skin in the same manner.

In amputations of the upper arm the incision is made on the

outer aspect of the limb, and is to be about six centimetres, or two and one-fourth or two and one-half inches, in length. The other steps in the operation are the same as described for amputations of the thigh.

When two bones are to be divided, the same technique is carried out with the exception that an osteotomy of two bones must first be made before the soft parts are cut through.

In the forearm the incision is made over the middle of the ulna and radius on the dorsal side, six centimetres in length. Here the bones are very superficial. In making the incisions the arm should be kept midway between pronation and supination.

For amputations of the leg the incision is made over the tibia at the point selected, either on the inner or outer aspect of the crest, and about nine centimetres in length. Neudorfer prefers the outer aspect. The tibia is first cut through with a chisel, then the fibula is divided either on the same plane or a little higher up. All the other steps are the same as already described, the only difference being that in amputation of the leg and forearm we have two periosteal cavities to obliterate and two skin wounds, respectively, over ulna and radius or over tibia and fibula.

Crédé, of Dresden,<sup>2061 99
95; Oct. 3, 96</sup> describes his method of amputation and claims that, since it makes no difference whether the operation is aseptic or antiseptic, whether an Esmarch bandage is used or not, and since it is much more rapid than the usual operation, it is especially valuable in military surgery. His method differs from the usual one in that no drainage or sutures are used. The wound is approximated and kept dry by the compression bandage, applied as described by the writer. This also controls hæmorrhage. Crédé contrasts his results with the usual statistics. He claims that not more than one-third of amputations heal by first intention after the usual operation. He has collected twenty-two operations in two years,—less than half from injuries, the remainder pathological. Two-thirds healed by first intention, the others with small local infections within three weeks, except one (four and one-half weeks).

[The methods of Neudorfer and Crédé are of advantage in certain cases and under certain conditions, but they have received, as yet, but little recognition among surgeons.—C. and F.]

Gleich,<sup>14
Feb. 27, 96</sup> performed amputation in one case by means of a method enabling him to make a solid and painless point of support in the stump itself. This method consists in closing the medullary cavity of the bone with a cutaneo-periosteal-osseous flap. The patient bears directly on the stump or upon a plaster support.

George Wiley Broom, of St. Louis,<sup>99
May 23, 96</sup> calls attention to the

fact that the particular point of amputation is not as important as the technique. If this is properly carried out and the cicatrix where it ought to be, the artificial limb-maker can readily adjust artificial limbs to any variety of stumps. In speaking of the drainage-tube he claims that it exposes the wound to one hundred and seventy-eight varieties of cutaneous bacteria. A blood-clot in a wound is not a foreign body, and, as blood possesses bactericidal properties, it is not a source of danger.

Gluck ³¹_{May 15, '95} calls attention to the necessity of teaching those who have suffered amputation of a limb the use of the artificial member which has replaced it.

Bier, of Kiel, ³³⁶_{July 6, '95} states that after an amputation the bony diaphysis becomes covered with a sort of hypertrophic cicatrix which is sensitive on pressure. Later on this cicatrix becomes atrophic, remains sensitive, and easily becomes ulcerated if the patient bear on the stump. In order that the stump may serve as a support the extremity of the diaphysis should be covered with a piece of bone without cicatrix. The skin at this place should be free from any cicatrix, and care should be taken not to interpose a layer of muscle, which readily turns into cicatricial tissue. Bier's method of obtaining a useful stump consists in detaching at the level of the amputation a piece of bone which can be folded at right angles and which will cover the diaphysis through union by first intention.

W. L. Estes, of South Bethlehem, ⁵⁹_{Nov. 3, '94} gives the results in 340 major amputations. Of these the detailed figures of the 294 single major amputations are as follow:—

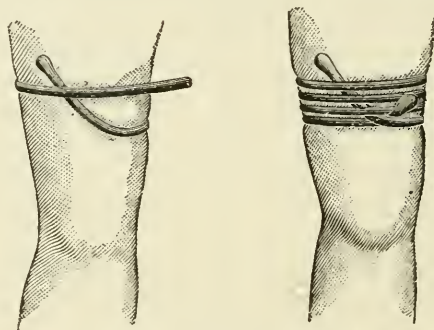
	No.	Deaths.	Mortality, Per Cent.
Forearm,	37	0	0.
Arm,	27	1	3.7
Shoulder-joint,	13	1	7.99
Foot,	19	0	0.
Leg,	97	2	2.06
Knee-joint,	17	1	5.88
Thigh, lower third,	44	5	11.36
Thigh, middle third,	25	2	8.
Thigh, upper third,	8	1	12.5
Hip-joint,	7	1	14.28

These surpassingly good results the author believes to be due to aseptic practice and to the saving of blood before and during operation.

In discussing the question "When shall we amputate in railroad accidents?" Thomas H. Manley ¹⁰¹_{Sept., '94} states that it should always be remembered that in such grave railroad accidents as seriously damage a limb one or more of the internal organs rarely escape, and, even though the patient may survive amputation, he sinks shortly afterward from some internal complication. The

underlying principle which should govern the surgeon, therefore, should be to amputate or detach only such structures as are irrevocably destroyed or useless, and never where such intervention jeopardizes life.

An elastic tourniquet is described by John C. Schapps, of Brooklyn.⁵⁹ The instrument is a modification of the ordinary rubber tube in that each end is closed by a large ball of the same material vulcanized in. The gap formed by the edges is neatly filled and the seam smoothly finished. Lodgment for dirt is thus avoided. The tube should be about half an inch in diameter, with a thin wall (about No. 16 gauge). A length of three feet will answer for almost any case, though for hip-joint amputation in a stout subject a longer one will be necessary, and for the limb of a small child a shorter one will be more convenient. The object of the balls, or knobs, is to make the instrument self-



ELASTIC TOURNIQUET. (SCHAPPS.)

New York Medical Record.

fastening. No clamp or tie of any kind is necessary. It may, therefore, be very rapidly applied, and with such little skill as to be particularly useful in emergencies. The cuts represent the tourniquet as loosely put on.

The following case is cited by James Bell, of Montreal,⁶ as illustrating a danger of the elastic tourniquet: On January 17, 1893, he excised the left elbow-joint of a slight and spare, but healthy, young woman, aged 20 years, for ankylosis in a useless position, due to an injury. The Esmarch band was in position for possibly half an hour (not more), and the operation was completed to his entire satisfaction. Further investigation showed that there was complete paralysis of both sensation and motion in the hand. The very first sign of return of movement appeared in the thumb and three outer fingers on February 7th,—twenty-one days after the operation.

Upper Extremities.

In the control of hæmorrhage in amputation at the shoulder, L. Gerald Dillon, of Seaham, ²_{Feb. 9, '95} makes the upper flap by transfixion, reflects it, secures all bleeding-points, and disarticulates the head of the humerus. He then passes a strong, notched needle through the lower flap, just under the surgical neck of the humerus, and hitches on to it a stout catgut ligature, which is drawn through and tied tightly over the inner edge of the flap, including the axillary vessels, skin, and muscle. The lower flap is then cut out, the artery being now completely under control, the vessels tied, and the temporary ligature removed.

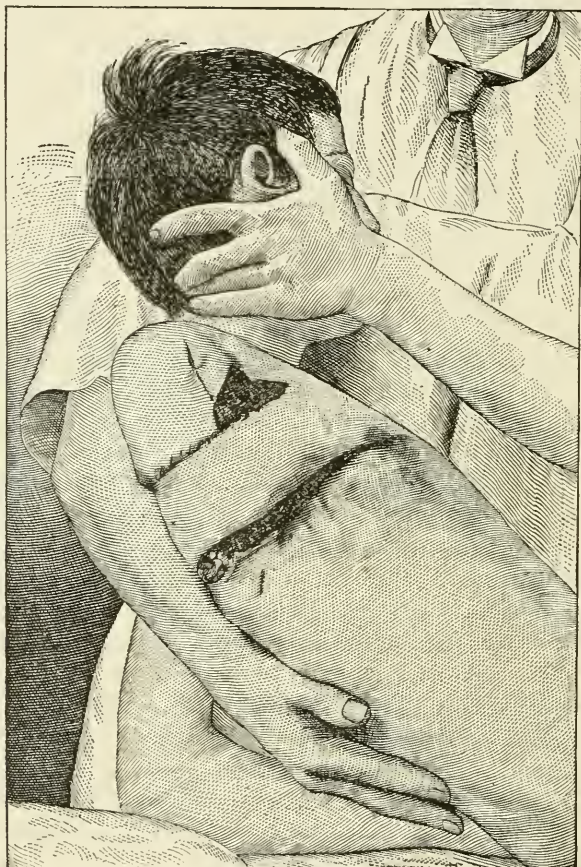
[Most surgeons prefer to cut the upper flap from without inward, owing to the tendency of the deltoid muscle to project beyond the margins of the skin, when the method of transfusion is employed.—C. and F.]

R. Clement Lucas, of London, ²_{Feb. 23, '95} regards Dillon's method as efficient, but unnecessary. He keeps the artery under his own command, adopting the following method: The deltoid flap having been raised and the head of the humerus disarticulated, the knife is carried down on the inner side of the bone somewhat below the neck. The left hand now grasps the inner flap between the thumb and fingers so as to compress the artery, the thumb being in contact with the raw surface and the fingers outside. Held in this way, the inner flap is completed by the knife without hæmorrhage, the surgeon retaining his hold until the vessel is secured with forceps.

A further case of removal of the upper extremity together with the scapula and clavicle is described by A. J. Ochsner, of Chicago. ⁹⁶_{Dec., '95} The patient was a slight, anæmic young woman, 19 years of age, suffering from an osteosarcoma originating in the upper extremity of the humerus and extending to the tissues of the shoulder-joint. She gained rapidly in weight and strength after the operation and has remained in perfect health ever since, supporting herself well by retouching photographs with her left hand. Ochsner reports a similar operation, in a man 46 years of age, for sarcoma.

A case of amputation of the entire upper extremity, including the clavicle and scapula, for sarcoma following fracture of the clavicle is also recorded by W. W. Keen, of Philadelphia. ⁹⁶_{June, '95} Cases of the same kind are reported by T. F. Chavasse, of Birmingham, ²_{Oct. 19, '95} Berger's method being employed, and by K. A. J. Mackenzie, of Portland, Ore. ⁸²⁰_{Oct., '95} F. J. Shepherd of Montreal, ²⁸⁴_{Oct., '94} performed interscapulo-thoracic amputation of the right upper extremity for chondrosarcoma of the shoulder-joint. He believes it to be the first operation of the kind done in Canada.

E. M. Foote, of New York, ¹_{Sept. 28, '95} describes a case from the clinic of William T. Bull. The patient, a boy aged 14 years, lost his right arm in machinery. He went at once to the hospital, where it was amputated about the middle of the humerus. The flaps sloughed badly and a granulating stump resulted. Four weeks later, in order to save the stump of his arm, a strip was dissected up from the ribs without loosening its ends, and the arm



PLASTIC OPERATION TO SAVE ARM-STUMP. (BULL AND FOOTE.)

New York Medical Journal.

tucked into this artificial pocket. (See illustration.) This flap adhered nicely, and two weeks later its posterior end was separated and wrapped about the stump. Ten days later the anterior attachment was freed and also wrapped about the stump. There was more or less suppuration, but no sloughing. The denuded area in the axilla was closed partly by a plastic operation, partly by skin-grafting.

Stephen Paget¹⁰⁷⁷_{Oct.10,'94} performed amputation for gangrene of the arm in a man aged 50 years. The type of the disease was so acute that to cut the deltoid flap it was necessary to go through tissues that were already sloughing, the result being that after the operation the whole of the deltoid muscle gradually sloughed away, showing a gaping granulating surface, as broad as the palm of the hand, at the inner angle of which the pulsation of the axillary artery could be seen. This slowly contracted and the patient recovered.

Lower Extremities.

Chalot, of Toulouse,³_{Oct.10,'94} observes that the two chief causes of mortality in disarticulation of the hip were, until recently, infection and hæmorrhage. The antiseptic method has reduced the deaths from the former cause, but the second, although not so mortal as formerly, still receives the study and attention of surgeons. To bring the operation of disarticulation to the same condition of preventive hæmostasis as amputation of the thigh, the author invented, in 1892, a method which consists in directly compressing with the fingers, through an iliac incision, the lower portion of the primary iliac vessels, two centimetres within the antero-superior iliac spine of the ilium. The skin, cellular tissue, and superficial fascia are successively divided for five centimetres in such a way that the incision corresponds to the spine of the ilium; the superior oblique, inferior oblique, and transverse muscles, as well as the deep layer of the aponeurosis of the transverse, are then cut and the peritoneum detached with the finger in the direction of the promontory. The common iliac artery is easily found when the angle formed by the internal rounded edge of the psoas and the corresponding flank of the promontory is reached. Direct compression of the artery may now be confided to an assistant against the wing of the sacrum, and the disarticulation may be proceeded with, not forgetting that there will be a reflux of blood from the upper end of the femoral vein, since the common iliac vein cannot be compressed at the same time as the corresponding artery. When the operation is finished the little-wounded iliac may be sutured, and, if asepsis has been proper, no complication need be feared. Chalot had employed this method, in a young man of 26 years, for encephaloid sarcoma of the thigh. There was some hæmorrhage from the iliac vein, but this was easily controlled by a ligature, and when the operation was finished the patient had lost but 120 grammes (4 ounces) of blood. On the twentieth day cicatrization was complete and the patient was able to go about on crutches. He died from recurrence six months later. The local condition was perfect.

Pollosson, of Lyons, preferred simply to amputate the thigh and then remove the upper extremity of the femur,—a method in vogue since the beginning of the century. He had performed this operation many times, as had Poncet, and only ten days ago had a case in which not more than 30 grammes (1 ounce) of blood had been lost. When care was taken to apply an Esmarch bandage at the root of the member, the danger from hæmorrhage was not of moment, but, on the contrary, a veritable transfusion took place, the blood having been made to flow into other parts of the body before removing the limb.

Chalot regarded the operation spoken of by Pollosson as only applicable in a certain number of cases, while the one described by himself was suitable for all, and especially in cases of tumor which has involved the root of the member, where the other method would be incomplete and would expose the patient to the danger of rapid recurrence in the stump.

[Several excellent methods of controlling hæmorrhage in amputation at the hip-joint, which offer advantages over those described above, have been perfected and extensively employed in this country (Wyeth, Senn, and others). A point of decided superiority is that bleeding is controlled in the posterior as well as in the anterior flap. The ligation of arteries, or their direct compression, becomes desirable, however, when diseased tissue encroaches too strongly upon the pelvis.—C. and F.]

F. T. Paul, of Liverpool, ¹⁸⁷_{July, '95} employs a very simple method for controlling the hæmorrhage. In the first place, the femoral artery is always tied as soon as the anterior flap has been cut; this should, in his opinion, be the rule, as half a minute's free bleeding from the femoral artery would probably prove fatal in a child already exhausted. The mode of fixing the elastic tourniquet is the following: Two pieces of calico bandage are placed in position, one crossing the opposite shoulder and the other the opposite hip. The tourniquet is applied over these pieces of bandage round the innominate bone, being hitched above the crest of the ilium in front and the tuberosity of the ischium behind. Then the free ends of the bandages are carried back to the shoulder and hip and tied sufficiently tight to prevent slipping when the limb is removed. This takes off some of the elastic strain over the external iliac artery; so a roller bandage is pushed under the tourniquet at this spot to increase the pressure on the vessel.

[While the patient's trunk remains straight a bandage over the shoulder, as described above, will hold the tourniquet securely in place; but if the trunk should become flexed toward the side of the amputation, the bandage will relax and permit the tour-

niquet to slip. The writer has witnessed the failure of a similar method.—F.]

According to Montaz, of Grenoble, ¹¹²⁶_{Nov. 15, '95} it is necessary, after resection of the hip-joint, to obtain as perfect consolidation as possible. This he secures by means of a nickel-plated nail, through the extremity of the femur and to a depth of one or one and one-half centimetres into the ilium, the two bones being thus firmly united. Two nails, instead of one, may be used if there is room, removing them at the end of several weeks, when bony union is perfect, through the wound, which has been kept slightly open for the purpose.

Habs ³⁰¹_{B. 40, p. 173;} ⁸¹⁴_{May 1, '95} recommends the adoption of disarticulation at the knee-joint, when there is sufficient material, rather than amputation low down in the thigh, quoting the experience of Hagedorn, with whom the operation had long been a favorite. Eighteen of the 20 cases reported were operated upon in this manner, and in only 2 was there any considerable gangrene of the flap, although in 3 others there was a narrow marginal necrosis. In 1 case the flap was cut too short, bringing the scar over the end of the bone and rendering it impossible to use it for support. The final result is noted in 14 of these cases, being good in 8, moderately good in 4, and poor in 2. Eight could use an artificial leg, taking its support from the end of the stump, while 3 could not bear this and required pelvic support as well. As to atrophy of the stump, this was observed only where it was not used for support. In some of the children (4 cases under 15 years of age) the extremity did not equal the other in growth, but the difference was not enough to impair its usefulness. The author estimates the results with judicial severity, and the advantages of the operation are not exaggerated.

A. G. Miller, of Edinburgh, ³⁶_{July, '95} has successfully employed, in several instances of disarticulation at the knee and elbow, an adaptation of the circular method of amputating, by which a long single flap is secured. The whole point and simplicity of the procedure depends on the well-known tendency to contraction of the soft structures of the flexor aspect of a limb, as compared with the extensor, after the tissues are divided. At the elbow and knee this tendency is increased by extending the joint and thus putting the skin on the flexor aspect on the stretch, while the skin on the extensor surface is completely relaxed.

Rioblanco ²¹¹_{Apr. 21, '95;} ⁸¹⁴_{Oct. 15, '95} collected 85 cases of Gritti's operation performed since 1880, with a mortality of about 19 per cent., none of the deaths being in any way dependent upon the peculiar method of the operation, but upon such causes as shock in traumatic

amputations, or in cases of cachexia, old age, etc. The technique of the operation is as follows: 1. To saw the femur six or seven centimetres above the line of the articulation, in order to be able easily to turn the patella under without division of the quadriceps. 2. To suture the patella with silk or catgut, not employing nails or wires, which may cause rarefying osteitis. 3. Immobilization of the stump and the hip-joint for five or six weeks, in order to get solid bony union. 4. Asepsis. Of 69 cases the patella was displaced only seven times, and in 2 of these it was easily restored to position. The most common cause for this accident was supuration. In 1 case an abscess of the prepatellar bursa formed, due to infection during healing of the wound, but this did not affect the usefulness of the stump. In all cases sufficiently followed the end of the stump was found to stand the pressure well, and the rule was to have the artificial limb bear directly upon it. One patient was seen as late as seven years afterward and the stump remained sound.

RESECTIONS.

New Procedures.

Mikulicz ³³⁶_{July 6, '95} states that von Bramann was the first surgeon who successfully performed resection of the long bones for malignant tumor. His case was one of sarcoma of the upper end of the tibia, and ten centimetres were resected, recovery taking place without recurrence. Mikulicz has obtained similar good results in two cases, and regards resection as advantageous in that it permits early extirpation of the growth. At the same time resection is much more acceptable to the patient than amputation or disarticulation. He has recently had successful results in four other cases of the same kind.

In the discussion König expressed the opinion that such a conservative measure was only warranted in cases of giant-cell sarcoma. In small-cell growths disarticulation was necessary on account of the great danger of recurrence after resection.

Jules Boeckel, of Strasburg, ¹⁰⁴³_{Jan., '95} ⁹⁶_{July} gives the results of resection of the knee without drainage in 64 out of a total of 125 cases which he has operated upon.

The first case in which drainage was omitted was in 1888. He arrived at this by several successive steps; first omitting the suture of the bone, then the ligatures, and, finally, the drainage. A summary of his method of operation is as follows: The first incision is a curved one passing above the patella and opening into the joint. Flexion of the knee. Division of the ligaments, first of the crucial and then of the lateral; the joint can then be

widely exposed. Resection of the articular surfaces, varying in extent according to the lesion present, and as small in amount as possible in children. Resection of the knee-pan and a careful extirpation of the synovial membrane and of all parts in the neighborhood which show pathological alterations. Incisions for the purpose of drainage occasionally are necessary. Disinfection of the field of operation and of any fistulous tracts which may be present. Fixation of the leg upon a splint and coaptation of the osseous surfaces. No osseous sutures and no ligatures. Suture of the skin wound by deep sutures emerging one to two centimetres from the edge of the wound. No drainage except occasionally a temporary one kept in place only during the application of the suture. Withdrawal of the drains before application of the dressing. Dressing of iodoform gauze and, finally, a removal of the Esmarch bandage. Vertical elevation of the limb for twenty-four hours. This dressing remains in place for from four to five weeks at least, at the end of which time the wound is healed. The sutures are then removed. To complete the cure it is only necessary that a dressing of silicate of soda be applied, which is to be worn several weeks or months, according to the age of the patient and the degree of consolidation. The patients can then begin to go about with the aid of crutches or, in some cases, with only a cane.

The 64 resections were all cured under the single operative dressing with one exception. Fifty-nine were healed without any suppuration and without a fistula persisting. The removal of the dressing and the immediate application of the silicate splint in the 63 cases were as follow: From the nineteenth to the thirty-first day in 38 cases; from the thirty-second to the forty-ninth day in 25 cases. The length of time that the patients remained in the hospital was, therefore, from three to four weeks in the most rapid cases and from five to seven weeks in the slower ones.

Of this series of 64 resections 4 have died from intercurrent affections, 1 from acute mania after two months, 1 from pneumonia following the grippe after two months (this was a woman 82 years of age), 1 from dropsy after fifteen months, and 1 from senile cachexia three years after the operation,—a woman of 78 years.

When the functional results are considered, omitting the 2 cases of amputation just mentioned, in the 62 cases 60 resulted in ankylosis with the leg extended and 2 in pseudarthrosis. These last were both in the same patient. A positive cure has been obtained in two-thirds of all the cases operated upon. As for the others, it is, perhaps, a little too early to express a positive opinion, although in 9 of them the operation was done nearly two years ago, and thus far there has been no recurrence.

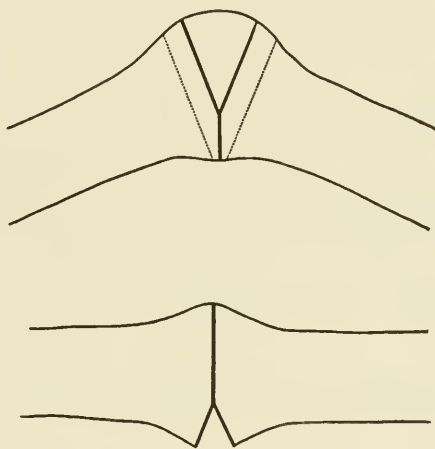
Schnitzler, of Vienna, ⁵⁷_{No. 11, '96} performed resection of the thoracic cavity for a chondroma, opening the pericardium. A cutaneous flap being attached and turned upward, and the growth laid open by section of some fascia of the great pectoral, it was seen that the base of the tumor was adherent to the third and sixth ribs. These were resected. The tumor sent several prolongations into the intercostal spaces and came in contact with the pericardium. In removing these portions the pericardium was torn on its anterior surface, the air whistling through. An attempt was made to suture it, but the movements of the heart rendered this difficult, the catgut giving way at once, and the bare heart could be seen beating through the enlarged orifice. As the pulse was small and quick, the surgeon saw that the operation should not be prolonged. The heart was therefore temporarily covered with a sterilized compress and the tumor removed with its ramifications, and without again attempting to suture the rent in the pericardium, which measured two and one-half centimetres, the cutaneous flap was turned down on the wound and sutured, the pericardium being simply protected by a strip of iodoform gauze, the end of which was fixed to the lower part of the wound. The whole was covered with an antiseptic dressing, and a piece of cardboard was placed above to protect the heart, in front of which there were now only soft parts. The patient was collapsed after the operation, but was revived by injections of camphor and an alcoholic potion. He had some difficulty in respiration during the night, but, in spite of sphacelus of a small part of the flap, he left the hospital cured in five weeks. The heart, which was at first protected against traumatism by a celluloid plate, soon became covered with skeleton through the contraction of the left half of the thorax and the reproduction of the ribs. When seen, a year after the operation, the man showed, at the point of implantation of the tumor, a simple depression, distinctly bony at its base. Recurrence of the growth—a hyaline chondroma—had not taken place.

E. Doyen, of Reims, ¹⁰⁴³_{Oct. 1, '96} performed partial resection of the sternum, clavicles, and the first ribs for malignant growth.

Typical resection of the elbow in fibrous or bony ankylosis, in cases rebellious to bloodless methods, has thus far not given satisfactory results; indeed, either the ankylosis returns after operation or the joint becomes a double action, or “polichinelle,” joint. Efforts have been made to modify the technique of the operation by Watson, Ollier, Defontaine, Vogt, and others. J. Wolff, of Berlin, ⁴_{Oct. 28, '96} in his turn, proposes a new plan, which consists in section of the bony or fibrous adhesions which prevent motion, this section being made in the open wound as fast as passive motion

of the joint demonstrates the obstacles to be overcome. The original point of the method is that the articulations themselves are not touched. The author has tried it in six cases, with three successes, the movements of the elbow becoming perfect. In two cases the suppuration of the wound prevented a successful result. Wolff believes that, although the number of cases is small, the method merits trial before resection proper is undertaken, success being almost certain in fibrous ankylosis. The reproduction of the articular surfaces after resection cannot always be definitely predicted; hence their preservation is, in his opinion, a great advantage of this operation.

To correct an angular deformity of the femur, George W. Miel, of Denver, ¹⁵⁵_{Oct., '95} practiced the resection shown in these cuts:



OPERATION TO CORRECT ANGULAR DEFORMITY OF THE FEMUR. (MIEL.)

Denver Medical Times.

He first removed a Y-shaped wedge, and by bringing the extremities end to end obtained the longitudinal outline shown in the second figure, the straightened position of the bone having been preserved by means of splints during the healing process. (Bone sawed through in this operation is shown in the cut between the strong and dotted lines.)

Caselli, of Genoa, ³_{Nov. 13, '95} describes a new operation for the cure of lesions of the lower ends of the tibia and fibula, as well as the astragalus, scaphoid, and cuboid, with integrity of the calcaneum. He makes an incision four centimetres above the external malleolus, twisting this, in descending, for a distance of seven or eight centimetres. He resects the malleolus and extirpates the astragalus; this done, he makes a similar incision and resects the lower

end of the tibia as far as the tibio-fibial insertion (*mortaise*), and even higher if the lesion is more extensive. If the scaphoid is involved he resects that bone also, and afterward the upper part of the calcaneum in such a way as to obtain an horizontal plane, upon which the resected surface of the tibia and fibula will be apposed, thus obtaining a disposition analogous to that of the Pirogoff operation as modified by le Fort, but with preservation of the forefoot. He fixes the tibia and fibula to the calcaneum by means of two buried metallic sutures. The entire front-foot is thus elevated and the scaphoid is apposed to the anterior lower extremity of the tibia. All the movements of the foot are preserved, and the shortening caused by the removal of the astragalus and the fragments of the tibia and fibula is easily remedied by a boot having a heel four centimetres high.

Carl Bayer, of Prague, ^{336 157}_{Aug. 24, '95; Dec.} employed a new procedure in a case of extensive caries of the left tarsal joint. An incision was made over the external aspect of the ankle and foot, and, as the soft parts included within the limits of this incision were absolutely useless, they were cut away, including the underlying portion of the joint-capsule. The extent of bone involved was now clearly visible. The tendo Achillis was separated from the tuberosity of the os calcis and all the diseased bone curetted away. The bones thus removed consisted of the astragalus, the scaphoid, the three cuneiform, the large upper portion of the os calcis, the greater portion of the cuboid, and the bases of the metatarsal bones. Following this the external and internal malleoli were sawed off. The foot was now held by the skin over the site of the internal malleolus and by the internal retromalleolar bundle of tendons, vessels, and nerves. After a thorough antiseptic irrigation and arrest of hæmorrhage, the middle of the upper surface of the remaining portion of the os calcis was adapted to the malleolar surface, a nail being introduced to approximate the parts.

A new indication and modification of the Wladimirow-Mikulicz resection of the ankle is given by A. Niche, of Breslau. ²²⁶_{B. 49, H. 1} Since its first introduction this operation has been growing in favor. Over one hundred successful cases have already been reported. It has been done for caries, trauma, malignant disease, badly-healed fractures, shortening of the limb, and paralysis with drop-foot. The author reports a case of extensive ulceration of the lower posterior part of the leg with ankylosis of the ankle in which he cut out the ulcer, resected the tarsus according to Wladimirow-Mikulicz, and covered the site of the ulcer with the skin of the heel. The result was satisfactory.

FRACTURES AND DISLOCATIONS.

By LEWIS A. STIMSON, M.D.,

ASSOCIATE EDITOR,
NEW YORK.

FRACTURES.

Fractures in General.

Uncomplicated Fractures.—The treatment of fractures of the limbs has received more than the usual amount of consideration during the year. W. Arbuthnot Lane, ²_{Apr. 20, '96} repeats his gloomy story of the high percentage of disability following fractures of the thigh or leg, declares again that not only has no advance been made, in recent years, in treatment, but that practice has actually retrograded, through the use of fixed dressings, and recommends direct operative interference,—incision and fixation of the fragments by screws. He even chooses Pott's fracture as an example, urging this fixation of the fibular fragments.

[This is an unfortunate choice, it seems to me, in view of the fact that disability after that fracture is habitually the result of lower tibio-fibular diastasis, which is comparatively independent of the fracture.—L. A. S.]

Biddoe, ⁶_{June 1, '96} gives the late results in 13 cases of Pott's fracture and 16 cases of fracture of the thigh to confirm and support Lane.

[Lane challenges those who think his statistics do not fairly represent the results to prove the correctness of their opinion by statistics. I have recently sent letters to patients treated during the last year at the New York Hospital for fracture of the lower extremity, and have received answers from 26 of them with the following results: Neck of femur, 3; limb nearly useless. Shaft of femur, 4; limb as useful as before the accident. Leg, 7, as good as ever; 3, good, but still with some pain. Pott's fracture, 6, as good as ever; 2, fairly good; 1, bad. These are distinctly better results than Lane's.—L. A. S.]

The ambulatory treatment of fractures of the lower extremity, as described in the ANNUAL of last year, has been the subject of numerous articles this year. Most of them have been abstracts of other articles or *résumés* of the literature of the subject, and testify only to the interest aroused, but a few present the records

of personal experience. Bardeleben reported, to the Twenty-fourth Congress of German Surgeons, ³³⁶_{No. 27, '95} 46 cases of fracture of the leg, of which 39 were thus treated; 2 out of 4 fractures of the patella, and 16 out of 23 fractures of the thigh, making a total of 180 fractures—135 of the leg, 7 of the patella, and 38 of the thigh—thus treated. He claims that the period of repair is shortened, that the general condition is less impaired, and that neighboring joints remain more movable. Warbasse ⁹⁶_{Feb., '95} reports 6 cases,—4 of the fibula, 2 of the tibia; Cabot ⁹⁹_{July 17, '95} reports 1 of fracture of the thigh; Bloch, ⁶⁷_{May 13, '95} 1 of compound fracture of the leg. Rendu ³⁵_{June 1, '95} claims priority for Raoult-Deslongchamps, who is said to have employed the method currently in fractures of the leg more than twenty years ago.

[It does not appear, from the reports, that the actual gain is very important or, indeed, that anything is gained over ambulation with the aid of crutches. While Bardeleben says that, in most cases, a single dressing is sufficient, others assert that the dressing needs constant supervision, and should be renewed every ten days. In fractures of the thigh a preliminary treatment by traction for from two to four weeks is necessary, and in fractures of both bones of the leg a similar delay of a week or ten days is required. In the slighter cases, such as the fractures of the fibula which constitute half of Warbasse's, there is, of course, nothing new in the method.—L. A. S.]

The method of early mobilization of neighboring joints and massage, as opposed to the long retention of fixed dressings, which has been gaining in favor for several years, has been advanced by the publication of a book by Lucas-Championnière ²⁰²⁰ and important papers by Landerer ³⁴_{V. 41, No. 50, '94} and Bum. ⁵⁷_{Nov. 11, '94} They claim that the period necessary for consolidation is shortened by one-third, and that for the regaining of full functional activity by an equal amount. The method, in brief, consists in the application of a fixed dressing and its maintenance until important changes in the relations of the fragments have been made impossible by the provisional callus,—a period varying from one to several weeks, according to the part involved; then the dressing is removed daily and re-applied, after massage of the limb and passive motion of the joints. Bum says the method is contra-indicated in fractures of the shaft of long bones with notable deformity and mobility, especially in oblique and torsion fractures.

Ununited Fracture.—Caird ³⁶_{June, '95} reports two cases of fracture of the femur which had remained ununited after the lapse of six and nine months, respectively, in which union was obtained by the method of passive congestion provoked by the prolonged

wearing of a snugly-drawn India-rubber tourniquet on the limb a short distance above the fracture. Swelling of the limb below the fracture was prevented by a bandage applied from the toes up to within three inches of the fracture. The intermediate area became "hard, swollen, and of a bluish-red hue." Union took place in three weeks in one case and in two months in the other. It is stated that the method was recommended some years ago by Thomas and by Helferich, and has also proved of service in the treatment of tubercular joints. In the discussion it appeared that the method had failed in two cases of non-union of the humerus.

Rioblane³_{Oct. 17, '94} advises early resort to operative interference in cases of delayed union in order to save time and diminish muscular atrophy. He refers to 27 cases to prove the harmlessness of the plan.

Compound Fractures.—Pershing⁹_{Feb. 2, '95} reports 20 consecutive cases of compound fracture of the limbs treated at the Presbyterian Hospital, N. Y., during a period of about six months, with 18 recoveries, 90 per cent., without suppuration; in 1 case amputation was done three months after the receipt of the injury. Schönwerth¹³_{Apr. 16, '95} reports 42 cases treated in three and one-half years in Angerer's service at Munich, with 37 recoveries. Of the 5 deaths 1 was caused by pneumonia, 1 by delirium tremens, and 3 by infection. Of the 37 recoveries 25 took place without reaction or complication, 6 after separation of a sequestrum, 3 after suppuration; in 1 union failed, and in 2 amputation was made necessary by suppuration. Fulton¹⁰²_{June, '95} reports 7 cases, all ending in recovery, but after suppuration in 2.

Localized Fractures.

Skull.—Dulles, of Philadelphia,¹⁹_{Aug. 3, '95} and Chipault and Braquehave³⁶⁰_{Sept. 4, '95} contribute important papers upon the mechanism of fractures of the skull which are too detailed to be summarized, but will well repay study. Dulles's paper deals only with the "bursting" theory of fracture, based upon the elongation of all diameters at right angles to the direction of the violence. The other deals with all varieties of fracture. (See Section A, vol. iii.)

Spine.—Burrell²_{Oct. 17, '94; Feb., '95} publishes a study of 168 cases of fracture of the spine, including 5 laminectomies, all treated at the Boston City Hospital. Of 82 cases treated previous to 1877 by the expectant plan 22 per cent. recovered; in the second series of 86, many of which were treated by forcible reduction of the displacement under ether and retention by a plaster-of-Paris jacket, the percentage of recovery was 33; 5 cases in this series were treated by operation,—1 immediately after the injury, ending in

death; the others after the lapse of several weeks or months, without benefit. The author argues for early operation.

Arnison⁹⁶_{May, '95} reports 3 cases of operation; in 1 the patient recovered fair use of his limbs, but it does not appear that the operation aided in the recovery; in the other 2 no benefit followed.

Ringnell⁵⁹_{Mar. 9, '95} and Winnett³⁹_{Jan., '95}; ⁶⁷³_{Mar., '95} each report a case of fracture of the cervical spine, caused by diving into shallow water. Both patients recovered, the former without, the latter after, operation.

[It does not appear that the operation aided in the recovery.—L. A. S.]

Clavicle.—Mauclaire³_{Oct. 17, '94} reports a case of fracture of the clavicle with complete loss of function in the limb, persisting three weeks after the injury. An operation was done to remove a splinter and bring the main fragments into a better position. Recovery.

Humerus.—An interesting and, possibly, important article on fractures at the lower end of the humerus is published by H. L. Smith.⁹⁹_{Oct. 18, 25, '94} It gives the results of an experimental study, upon the cadaver, of the pathology of the fractures and of the effect of the attitude of the limb upon the fixation of the fragments. He found that in full flexion of the elbow, after fracture of either condyle, or transverse, or T-fracture, the lower fragment is less easily displaced than in any other attitude, the fixation being due to the fact that the fragment is held snugly against the ulna and radius by the coronoid process in front of it and the tendon of the triceps and the capsule behind.

In a subsequent paper⁹⁹_{July 4, '95} he discusses associated points, describes methods of fixation of the limb, and gives clinical results, about thirty cases having been thus treated in the Boston City Hospital; he finds that "the amount of motion gained has been slightly greater and the amount of deformity very much less" than after other methods. The essence of the method lies in full flexion, which, according to the author, radically differentiates it from current methods of partial flexion, such as that described by Jones.²⁶_{Jan. 1, '95} It is, of course, necessary to make accurate reduction of the displacement before fixing the limb in flexion, for the posture only insures retention of the fragment in the position given to it; it does not, of itself, put it in its proper place.

[After all, this is the prime essential, and I believe that, if it be carefully attended to, there are other methods of dressing which will, and in some hands habitually do, furnish equally good results.—L. A. S.]

Smith maintains the limb in full flexion preferably by binding the forearm to the arm by means of a strip of adhesive plaster at the level of the wrist; he also mentions, with approval, a dressing used by A. Post, in the Boston City Hospital: "a sleeve, made at the acute angle desired, is fitted to the arm, one side being stitched up after it is applied, the ends of the sleeve extending far enough to be tied behind the neck as a support." Poirier,³_{Oct. 17, '94} of Paris, collected 68 cases of fracture of the humerus, grouped as follows: 41 of the upper extremity, 15 of the shaft, and 12 of the lower extremity.

Radius.—Hennequin,⁹¹_{July 10, '94} makes an interesting study of the mechanical conditions of the bones of the forearm in their relation to the production and seat of the common fracture at the lower end of the radius. Rejecting the now largely discredited theory of fracture by cross-strain through the palmar ligaments in hyperdorsal extension of the wrist, he seeks to explain the position of the fracture, at the lower end instead of at the middle, by showing that force is transmitted from the carpus to the humerus (1) through the lower end of the radius, which alone articulates with the carpus; (2) through the interosseous ligament to the ulna; (3) through the upper end of the ulna, which alone closely articulates, in the extended position of the elbow, with the humerus. As the result of this arrangement the central point of the radius, at which fracture should occur in a fall upon the outstretched palm (other things being equal), lies between its inferior articular surface and the lower fibres of the interosseous ligament,—the point where, in fact, it does most frequently occur.

Petersen,³³⁶_{July 28, '94} recommends that splints should be wholly discarded in Colles's fracture and the limb simply supported in a sling, in such a way that the hand should hang unsupported in ulno-volar flexion, to be preceded, of course, by reduction of the displacement.

Femur.—Lejars,³_{Oct. 17, '94} reports a case of resection of the head of the femur, a year after fracture of the neck, because of failure of union and the uselessness of the limb. Recovery with good function.

Patella.—G. R. Fowler,⁹⁶_{May, '95} in a paper embodying a careful study of the subject, reported a method of treatment which he had employed with success, and which he recommended as involving only slight operative interference. It consisted in the exposure of the seat of fracture by an incision, clearing of the joint, and approximation and retention of the fragments by an instrument somewhat resembling Malgaigne's hooks. In the discussion which followed (New York Surgical Society) all the speakers agreed in

deprecating operative interference as routine and universal treatment. The success of massage and early use of the limb is reported by several writers, as is also that obtained by Malgaigne's hooks.

Crucial Ligaments of the Knee.—Bayeux⁷_{No.7,'94} reports a case in which both crucial ligaments were torn away, together with the spines of the tibial plateau to which they were attached.

Tibia.—Albers⁴_{Dec.17,'94} reports three typical cases of fracture by compression of the upper end, first described by Wagner in 1886. It is caused by a fall upon the feet, the knee being fully extended; the internal condyle of the tibia is crushed and the external lateral ligament ruptured or stretched. Finotti¹³_{Apr.16,'95} reports a case of death by fat-embolism of the lungs twenty-four hours after fracture of both astragali and of the upper end of the left tibia.

Ankle.—Balch⁹⁹_{Aug.30,'94} reports five cases of compound fracture of the ankle-joint successfully treated in the Massachusetts General Hospital. Pilcher¹⁵⁷_{Aug.'95} reports another.

Splints.—W. J. Taylor, of Philadelphia,¹¹⁹_{Jan.12,'95} describes and highly recommends a material suggested by E. A. Tracy, of Boston, for splints. It is made of wood-pulp strengthened by the introduction between the layers of a woven fabric or of long jute-fibre. It is rendered plastic by moistening (preferably with a solution of silicate of soda or of dextrin), and, after having been molded to the limb, is stiffened by drying. It is light and strong.

DISLOCATIONS.

Jaw.—G. T. Mockett, of Longton, Staffordshire,²_{June,'95} recommends a method which he has found very much simpler than those usually resorted to. The hands have free play outside the cheeks, which act as a pad. The forefingers rest in the hollow at either side on the anterior border below the coronoid process of the ascending ramus, the middle fingers on the external border of the angle below the ear, allowing firm, gentle pressure backward and downward to antagonize the tension of the muscles, while the other fingers are brought under the horizontal rami of the jaw with the thumbs on either side the symphysis, so giving the counter-action. Anterior, posterior, or lateral force can be so commanded as to allow the parts, by combined gentle manipulation, to glide gradually into apposition.

No inconvenience as to snap need take place, as in the ordinary method; it takes less time, is unattended with any risk to patient or operator, and is certainly much more delicate, as no

undue force need be exerted, and success is attained with perfect ease.

Atlas.—Hesse¹³_{Jan., '95} reports a case of forward dislocation of the atlas from the occiput. Reduction and recovery.

Elbow.—Two cases of divergent dislocation of the ulna and radius at the elbow are reported by Petzholdt³⁴_{Dec. 11, '94} and Ferguson²_{Apr. 6, '95}. In each the ulna was displaced upward behind the humerus, the radius upward in front, and in Petzholdt's toward the inner side. Reduction was effected in each case.

Ulna.—Berger, of Paris,¹⁷_{Apr. 13, '95} reports a case of backward dislocation of the lower end of the ulna, in a girl 10 years old, which had existed for two years. He was able to reduce it under chloroform and maintain the reduction by a bandage.

Carpus.—Two cases of backward dislocation are reported by Hollis⁶_{Dec. 8, '94} and Morton²_{July 20, '95}. The patients were boys 14 and 16 years old. Reduction was easy.

Semilunar.—Albertin²¹¹_{Dec. 9, '94} reports a case of compound forward dislocation with complete separation. Gamgee⁶_{July 6, '95} reports one of simple dislocation of four months' standing; extension was complete, flexion wholly lost. The bone was removed, with a complete restoration of function.

Hip.—Spencer²_{Feb. 16, '95} successfully reduced a dorsal dislocation of five months' standing in a boy by open operation. "By division of muscles the head of the bone had been replaced in its joint and fixed there."

Ostermayer⁸_{No. 40, '94}; ³³⁶_{May 11, '95} treated a nineteen-month-old dislocation by excision of the head through a posterior incision.

Semilunar Cartilages.—Turner³⁶_{Sept., '94} read before the Medico-Chirurgical Society of Edinburgh a paper in which he studied the pathology and causes of displacement of the semilunar cartilages, and gave the results of 29 cases operated upon by Annandale,—21 by removal, 8 by suturing; a useful joint resulted in 28. The same subject is studied by Pauzat⁹¹_{No. 2, '95}; ²_{Mar. 23, '95}.

Patella.—Appel³⁴_{June 25, '95} reports two cases which he had the opportunity to examine after death; after the discussion of other cases and theories, he concludes that "a marked deformity of the external condyle of the femur, including its trochlear surface, is almost always present" in these cases, and explains the production of the dislocation.

Aldibert,¹¹⁸_{Dec., '94} in a study of habitual dislocation of the patella in young children, based on 33 personal observations, finds the most frequent, almost universal, cause in genu valgum.

Great Toe.—Choux²⁴³_{May, '95} reports seven cases and Vignol³⁵_{Jan. 12, '96} one case of this dislocation. Each adds a history and study of the

subject, which, however, show only that this injury has profited by modern improvements in surgical dressings; that is, that the results of recent operative interference in the irreducible cases and of recent compound cases have been good.

DISEASES OF THE ARTERIES AND VEINS.

BY THE CENTRAL EDITORIAL STAFF.

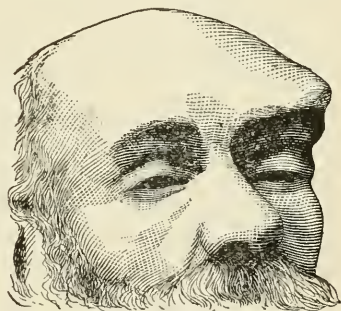
SUBMITTED FOR COMMENTATION TO

CHRISTIAN FENGER, M.D.,

ASSOCIATE EDITOR,
CHICAGO.

Aneurisms of Arteries.

Temporal.—Burton Robinson, of Morpeth, ²_{Dec. 7, '95} reports a case of traumatic aneurism of the anterior temporal artery in a man, aged 70 years, who was suffering from organic brain disease, and who had had rare, but severe, epileptic attacks. During one of his seizures he fell forward off a garden-seat, and received injuries consisting of slight cuticular abrasion and severe contusion of the tissues about the left external angular process of the frontal bone. The illustration shows the condition when the aneurism had developed. The tumor slowly increased in size.



ANEURISM OF THE ANTERIOR TEMPORAL ARTERY.

(BURTON ROBINSON.)

British Medical Journal.

Small circumscribed traumatic aneurisms usually occur in connection with injuries to such arteries as the palmar, plantar, radial, and ulnar. Erichsen mentions having seen two cases of traumatic aneurism of the temporal artery resulting from cupping in the temporal region. The nature of the exciting cause and the uncommon seat of the aneurism, with the close likeness of the tumor to a suppurating hæmatoma in the early period, make the case noteworthy.

Orbital.—Thomas G. Morton, of Philadelphia, ⁹⁶_{Sept., '95} presented a patient showing the result of a ligation of the right common carotid artery, performed in December, 1864, for aneurism of the orbit. The patient, then 36 years of age, was awakened from sleep in March, 1864, by a noise in her head which sounded like the report of a pistol. She at once felt pain in the right eye,

which soon became prominent and pulsated. There were present also dilated pupil, impaired vision, and general venous fullness of the vessels of the eye and brow. Pressure on the carotid controlled the pulsation and bruit. The carotid was tied in December of the same year. The symptoms promptly disappeared, and the patient has continued in good health since.

Aortic.—Alex. Bruce, of Edinburgh, ²_{Jan. 26, '95} observed a case in which the aneurism perforated the superior vena cava, and the patient died from an attack of œdema glottidis. Upon post-mortem examination a great deal of thickening was found in front of the aorta. A large aneurism, which had grown forward and to the right, extended from the aortic valves to the innominate artery. The vena cava was firmly bound down by a mass of fibrous tissue, which passed from the aneurism to a dark mass behind. When the superior vena cava was exposed it was found that there were two minute perforations in it from the aneurism. The two openings were evidently different in date. The right azygos vein was enormously dilated. The lungs showed a moderate degree of stone-masons' interstitial pneumonia.

In a case of aneurism of the ascending aorta, described by Bignone, ⁵⁸⁹_{Mar. 1, '95} two Macewen needles were inserted into the aneurismal sac, allowed to remain for twenty-four hours, and then withdrawn; this treatment was repeated on December 4th, 6th, and 14th. Satisfactory results followed immediately after the first operation, and finally the tumor was reduced to one-third its original size and the pulsation almost disappeared. A last puncture was made on January 10th, the needle communicating the impression that a fibrous tumor had been traversed before a small cavity in the centre was reached. The patient was, at the time of the report, able to sit up all day and walk about without pain or discomfort.

A. T. Bristow ¹⁵⁷_{Oct. '95} concludes that aneurisms of the thoracic aorta may be most safely attacked after medical treatment has failed, by the introduction of a small quantity of inelastic wire. Abdominal aneurisms may first be explored through a laparotomy wound, so as to determine their exact nature and relations, after which the question of treatment will depend on their situation.

Subclavian.—In a praiseworthy paper upon the operative treatment of aneurisms of the third portion of the subclavian artery, E. Souchon, of New Orleans, ⁹⁶_{Nov., '95} gives a thorough review of the subject in all its bearings. It is based on the study of 115 operated cases, of which 31 are traumatic, 81 idiopathic, and 3 recurrent. The author gives the following deductions as to treatment: Strict asepsis is the sheet-anchor and is so important that

cases of the pre-aseptic period should be omitted from all statistics or comparisons. Next to this, the best plan is to ligate the first portion of the subclavian with a double or, better, triple, non-contiguous, absorbable ligature without rupturing the coats.

Senn was the first to recommend double ligation in the continuity of an artery. He relied on the bloodless space between the ligatures for obtaining prompt and early obliteration of the lumen of the vessel. Senn's idea of applying double non-contiguous ligatures afforded a deep sense of security that never existed before. Souchon considers it preferable to ligate the first portion of the subclavian rather than the innominate, as the cerebral circulation is not interfered with. Twyman's statement that cerebral symptoms occurred three times in twenty-two cases—*i.e.*, in about 17 per cent.—should be borne in mind.

When it is decided to ligate the subclavian and the common carotid simultaneously, it is best to first ligate the subclavian; otherwise the increased impulse against the subclavian might prevent the proper tightening of the ligature.

It would be safer to ligate the vertebral in like manner at the same sitting. If this is not done and if pulsations continue or return, it becomes a necessary procedure. Souchon advises the above course because he does not believe that an artery can regain its patency after it has been so effectually obliterated by a double or triple catgut ligature tightened not so as to rupture the coats, but enough to stop all pulsations in the aneurism and the large efferent artery. In a case cited this repatency occurred, but it was because a single ligature had been applied, and on such a large vessel as the innominate.

In some of the successful ligations silk was used, and in most of them the coats were probably ruptured, yet the same occlusion can be obtained with as much certainty and less risk with absorbable ligatures when used double and especially non-contiguous,—*i.e.*, with a bloodless space between the two. In some unsuccessful cases absorbable single ligatures were used. The double ligature is imperatively indicated when the vessel is found much enlarged and somewhat thinned.

As regards the choice of operation, Souchon unhesitatingly advocates resection of the inner extremity of the clavicle and of the adjoining part of the sternum. It is of the utmost importance that the ligations should be deliberately, systematically, and thoroughly done, and everything should be sacrificed to that end, upon which depends the supreme aim itself. The recent case of H. L. Burrell is quite in point. Cooper, of San Francisco, had preceded him in 1859. Bardenheuer, who has repeatedly exposed the

innominate and its branches by such an operation for removing tumors involving the root of the neck, says that these points can only be carried out by such resections of the bones mentioned.

It should be borne in mind that, in idiopathic aneurisms, the general condition of the patient is defective, and, if time allow before operating, proper care should be taken to have him in as good general condition as possible. Whatever peculiar diathesis may exist should be properly counteracted and his blood made as rich and plastic as possible by careful diet, thorough rest, and proper medication.

E. Mayer ⁴¹_{Nov. 4, '94} recorded a case of aneurism of the subclavian and carotid arteries. The right vocal cord was fixed in the position which it occupies in the cadaver, with a slightly concave border, and all the right side of the neck and the right subclavian fossa exhibited pulsation. A pulsating tumor, the size of a child's fist, could be felt behind the clavicle.

Gussenbauer, of Vienna, ²²_{June 26, '95} showed a case of aneurism of the subclavian artery which he first commenced to treat by digital compression without success. He then ligated the artery, but the pain which tormented the patient before the operation still continued. Pulsation over the part where the sac was formed before the operation could not be found, and the sac itself seemed to have been absorbed.

Ch. Monod, of Paris, ¹⁰_{Jan. 20, '95} recorded a case of subclavian aneurism in a man, 51 years old, who suffered from severe pain in the shoulder and arm. Ligation of the brachiocephalic trunk being impossible, a ligature was placed below the aneurism on the subclavian and another on the carotid at the base of the neck. The immediate result was excellent, and four months later there was no trace of the tumor.

Pye-Smith, of Sheffield, ⁸²⁴_{Apr., '95} describes a unique case of traumatic aneurism in a man who had fallen from a height. Eighteen days after admission the patient died, his death being preceded by the vomiting of about half a pint of blood on two occasions. At the autopsy there was found a traumatic aneurism of the posterior mediastinum, which had ruptured into the œsophagus. This aneurism was due to the rupture of an aberrant right subclavian artery. The right carotid artery was seen crossing the trachea obliquely a short distance below the tracheotomy wound and was flattened by pressure forward of the trachea. This vessel was found to spring directly from the aorta, the innominate being absent; while the right subclavian artery was found to arise from the aortic arch beyond the left subclavian, which it crossed between the spine and the œsophagus at the level of the third dorsal ver-

tebra, at which point there was a traumatic aneurism about two and one-half inches in diameter. The openings in the artery and the œsophagus were evident.

H. G. Croly, of Dublin, ²²_{Dec. 11, '95} reported the case of a man who had been stabbed by a pair of scissors both above and below the left clavicle in 1893. He had been treated for five months by pressure for an aneurism which had developed. Later on he was again admitted to hospital with another, but larger, aneurism involving the third portion of the subclavian and the three portions of the axillary artery, which no treatment succeeded in curing. Croly tied the artery in its second portion under considerable difficulty, owing to the depth of the vessel. The case, up to latest accounts, was doing well, all pulsation having ceased.

Axillary.—Fenner, ⁶_{Jan. 12, '95} in a case of traumatic aneurism of the axillary artery, performed ligation of the latter, which he preferred to the only other alternative,—namely, to open the aneurism, turn out the contents, and attempt to tie both ends of the artery,—an operation fraught with great danger to the limb and to the patient in his then weakened condition.

Cases of axillary aneurism, with successful ligation of the subclavian artery, were recorded by F. Neugebauer, ³³⁶_{Aug. 17, '95} Orville Horwitz, of Philadelphia, ⁸⁰_{May 16, '95} and W. E. Waters, of Columbus Barracks, O. ⁵⁹_{May 25, '95} In Waters's case the mobility of the hand had become greatly impaired. Two and a half months after the operation, however, the patient was regaining the use of the fingers and wrist-joint and the tumor in the axilla had diminished in size.

A patient of Coppinger's, ⁶_{Aug. 24, '95}; ²⁰⁹¹_{'95} whose innominate artery was successfully ligated in January, 1893, for the cure of subclavian aneurism, is now being exhibited in London. The patient, a man aged 59, was in good health two years and a half after the operation, and is the only living example as yet exhibited in Europe of cure of subclavian aneurism by innominate ligation.

Brachial.—Bland Sutton ²²_{Sept. 20, '94} operated upon a woman, aged 40, on account of a tumor at the bend of the elbow which had made its appearance seven years previously. Before operation it was regarded as a neuroma of the median nerve, but on exposing the swelling it was seen to be a cured traumatic aneurism of the brachial artery. On account of the excruciating pain which the patient suffered, Sutton cut the artery above and below the aneurism and dissected out the sac.

Innominate.—H. L. Burrell, of Boston, Mass., ⁹⁹_{Aug. 8, '95} reported a case of ligation of the innominate artery for aneurism, and gave a history of the operation, with personal observations. He believed this to be the seventeenth case recorded, but considered that some

of the successful results in these cases had been prematurely reported. Had he published his case a little earlier it would have appeared as a successful case. The first ligature was applied three-fourths of an inch above the aorta. A second was passed about half an inch higher, but was not completed, owing to some symptoms noticed. The patient made a good recovery. Abnormal sensation and local irregularities in the circulation had almost disappeared on the eighth day after the operation. The patient left the hospital about the seventieth day and returned to his business. He appeared to be well in every way, but died suddenly on the one hundred and twenty-ninth day, after faintness and pallor. The complete absence of pain and the perfect comfort of the patient after operation were quite remarkable.

Post-mortem examination revealed the following condition: Circumscribed dilatation (fusiform aneurism) of right subclavian, innominate, and right iliac. Double ligature of innominate artery. Occlusion of artery by the upper ligature, severance of artery by lower ligature with subsequent healing, the ligature remaining within the artery and the continuity of the lumen being restored. Cardiac hypertrophy and dilatation. Relative insufficiency of the cardiac valves. Chronic passive congestion of lungs, liver, spleen, and kidneys. Ascites. Pleuritic adhesions over lower lobes of both lungs. Old tuberculosis of apices of both lungs, with induration. Chronic interstitial orchitis.

The case seems to teach the following important lessons: 1. That a patient with general arterio-sclerosis and an enlarged and dilated heart may be kept under ether an hour and a half, subjected to a severe operation, and still recover with but little shock. 2. That while the ligation of the innominate artery is not of necessity fatal, yet it will always be an extraordinary operation, fraught with danger from the cutting off of an extensive area of circulation. The removal of the sterno-clavicular articulation and as much of the sternum as may be necessary makes the operation more practical and one of relative simplicity and safety. 3. That the secondary hæmorrhages which have occurred in almost all the recorded cases were undoubtedly due to local sepsis, and that the recovery in this case was due to the accuracy with which the ligatures were placed and to the asepsis. 4. That, if the innominate is ligated at all, two ligatures are necessary, one to act as a break-water by obstructing the constantly-recurring waves of blood coming from the aorta. 5. That the collateral circulation is principally established, as in the case reported, by a downward stream of blood from the right carotid and vertebral arteries into the right subclavian artery.

While the fusiform aneurism had shrunk, there was very little fibrinous clot above the second ligature. This would lead Burrell, in another case of fusiform aneurism in this situation, to ligature the carotid if possible, the subclavian in its first portion, and, if practicable, the vertebral. But the unique behavior of the first ligature applied to the innominate is, perhaps, the most interesting fact. When the innominate artery was tied, something in the wall was felt to give way. The ligature gradually cut its way through the coats of the vessel, followed by an inflammation with organization which prevented a secondary hæmorrhage, and finally rested, probably covered with a smooth layer of the intima, inside the innominate artery. This places a new fact at our disposal as regards the final disposition of the ligature. The author gives a brief description of twenty-nine cases found in the literature and of five incomplete cases.

Coppinger, of Dublin, ⁶_{Aug 24, '76} performed double distal ligature, in a man suffering from a large, thin-walled innominate aneurism which had produced forward dislocation of the right clavicle and which had defied the usual medicinal measures of treatment,—viz., prolonged rest, iodide of potassium, etc. The right subclavian and common carotid arteries were simultaneously ligated and both wounds healed *per primam*. Three weeks later consolidation had not taken place in the aneurism, but its pulsation had become much less strong, while its walls had become thickened by fibrinous deposit. The arteries of the patient's right arm were, moreover, pulseless.

Sciatic.—Guelliot, of Rheims, ¹⁴_{Oct 26, '76} reported a case of aneurism of the sciatic in a man 79 years old, who fell down stairs. He was able to walk afterward, but three days later entered hospital, when ecchymosis of the buttock and posterior internal region of the thigh was found. Guelliot diagnosed a probable fracture of the ischium. The ecchymosis soon disappeared, but an enormous fluctuating tumor of the buttock remained, impeding the movements of the patient and causing symptoms of compression in the region of the sciatic nerve. Incision of this tumor gave exit to two litres of blood-clots. When the cavity was nearly empty some harder clots were removed, and it was seen that arterial blood flowed out in large quantities, apparently from the neighborhood of the sciatic notch. The incision was prolonged so as to make a large flap on the buttock and to lay open the spot from which the blood came. A pocket as large as a walnut was seen, with friable and readily detached walls, smooth on the inner surface. It was a false aneurism, above which the artery was easily seized by an hæmostatic forceps, which was left in

position. This artery, which was completely separated, was situated under the pyramidalis, immediately above the sacro-sciatic ligament. It was, therefore, the sciatic, apparently cut by a fragment of bone. A point of special interest in the case was the presence of two cavities,—one small, limited, aneurismal, behind and outside of the ischium; the other, very large, badly defined, occupying the entire buttock, non-pulsatile, and covering the first cavity.

Gluteal.—A case of diffuse aneurism of the deeper portion of the buttock was reported by Troy.²⁴³_{Sept., '95} Notwithstanding the fact that a fall in 1892 was the only accident related by the patient, he did not attribute to this the consecutive symptoms presented on his admission to hospital, consisting of intense pain localized in the upper part of the thigh and in the left iliac fossa. This pain increased upon extension of the hip on the pelvis, the thigh being permanently flexed, as in inflammation of the psoas or in beginning coxalgia. The pain did not increase on pressure. The author is inclined to consider the case as one of spontaneous origin, and that evidences of hæmophilia, demonstrated later on, attest a special atony of the arterial vessels and also show that the muscular ruptures described were due to violent and sudden distension produced by large blood-clots. Incision gave rise to dangerous primary and secondary hæmorrhages, which finally yielded to tamponing. The wound healed with difficulty and the patient finally recovered.

External Iliac.—A case of traumatic aneurism of both external iliac arteries was recorded by T. G. Morton, of Philadelphia.⁹⁶_{Sept., '95} Examination revealed a large, irregular, non-pulsating tumor, with feeble bruit, occupying the left groin, and absence of pulsation in the vessels of thigh or leg; complete numbness in the distribution of the anterior crural nerve, total absence of patellar reflex, thigh somewhat swollen, two inches more in circumference than the right. In the right groin was a small pulsating tumor about the size of a walnut, with marked aneurismal symptoms and with very feeble circulation below this point. The right thigh, which had been kept flexed since the accident, could not be extended owing to muscular contraction. It seems probable that, incident to a violent strain, both iliacs were injured, the left more than the right, with rapid development of a tumor which, by pressure, involved the anterior crural nerves.

Since favorable progress was going on in the tumor in the left groin, Morton did not deem operative interference advisable. Ligation of the iliac might, he thought, be required for the active aneurismal tumor on the right side, if the disease should con-

tinue to develop or if serious symptoms should appear, but, as the patient had improved so, delay seemed more than justifiable.

Quénu¹⁴_{Dec.5,'94}⁹⁹_{Jan.10,'95} recorded the case of a man, 36 years old, upon whom he had successfully performed extirpation of an aneurism of the right external iliac. The aneurism occupied the whole right iliac fossa, and was as large as the head of a child at term. Sixteen days later an aneurism of the left femoral artery in the inguinal region was extirpated in the same patient. Recovery was uneventful, and at the time the patient was shown he had been following his occupation as a clown for a month.

Ilio-Femoral.—Makins, of London,²_{Nov.30,'95} showed to the Clinical Society a man, aged 34, who came to him with a large ilio-femoral aneurism. As he could not be sure of being able to ligate the external iliac artery, he made his incision through the semilunar line, not exclusively through fibrous tissue, and managed to ligate the external iliac artery. The patient was up and about by the forty-seventh day. Three months later he came back complaining of pain in the opposite groin, where there was a pulsating swelling not so large as the previous one. Makins considered this to be due to gummatous arteritis and repeated the operation. This time he recovered much more rapidly than on the first occasion, the collateral circulation being established more promptly. This he attributed to the dilatation of vessels following ligature of the other external iliac artery. The patient had worn a belt ever since and had no hernia, though he was a carpenter and worked hard.

Femoral.—Albert Lucas, of Birmingham,³²_{Jan., '95} reported a case of femoral aneurism due to a kick in the groin five weeks before. The aneurism was in the common femoral, extending from an inch above Poupart's ligament to nearly the apex of Scarpa's triangle. The external iliac was ligated by means of an incision higher and more external than Abernethy's, Ballance and Edmunds's "stay-knot" being used. Three weeks later some redness was noticed over the front of the leg; this increased, and eventually the anterior tibial muscles sloughed out. On November 9th amputation of the thigh at junction of the lower fourth with the upper three-fourths was performed. The wounds healed by first intention. The aneurism is now quite solid and not larger than a walnut.

A case of ligation of the femoral artery is reported by Southam, of Manchester,⁶_{May 23,'95} for secondary hæmorrhage, and another by R. N. Hartley, of Leeds,⁶_{June 22,'95} in which secondary hæmorrhage occurred in a case of necrosis of the femur, necessitating ligation of the femoral and external iliac arteries.

Thorburn, of Manchester,²_{Dec.29,'94} mentioned a case which had

occurred in an old amputation stump; it had been successfully removed by enucleation. About four months after the operation sudden perforation of the common iliac artery on the same side had occurred without apparent cause.

H. W. Sawtelle¹_{Feb. 23, '95} reported a case, located immediately under Poupart's ligament, successfully treated by digital compression.

Israel, of Berlin,⁴_{Oct. 28, '95} reported a case of aneurism of the terminal end of the femoral artery, in which operation showed that the tumor was composed of two parts,—one, a cyst with thick walls, filled with a brownish fluid; the other, situated below the first, consisted of a series of small, irregular cavities filled with arterial blood from the deep femoral. The operation was difficult, owing to the presence of the sciatic nerve, which traversed the aneurism in certain parts. The after-course, however, was simple, and recovery was complete.

Drschenewitsch⁸⁰⁰_{Dec., '94} recorded a case of false traumatic aneurism of the femoral artery in which operative procedures were followed by death.

Popliteal.—A case of pulsating tumor of the popliteal space simulating aneurism was reported by Marmaduke Shield, of London,⁶_{Oct. 6, '94} as illustrating some of the manifold difficulties that may attend the diagnosis of tumors in the popliteal space. The resemblance of the swelling, when first seen, to diffused aneurism was very close, but when the œdema of the superficial parts had subsided it was easy to prove that the pulsation was not of the true distensile aneurismal nature. The resemblance to popliteal abscess was then exact, and any want of caution, such as making a hasty incision, would have led to uncontrollable bleeding from the soft vascular growth. The case well illustrates the importance of using the exploring needle in deep-seated fluctuating tumors, and of observing their progress with care and patience before cutting into them.

A case of double popliteal aneurism treated by compression was recorded by Golding-Bird, of London,²_{Jan. 12, '96}. Three months later both sacs were consolidated and the pulsation in the posterior tibial was absent on both sides. The patient became fatigued and the calf-muscles ached if he walked at all quickly; otherwise his condition was excellent. Iodide of potassium, administered from the start, was still being continued.

J. Hutchinson, Jr., of London,²²_{Oct. 16, '96} ligated the femoral artery in Hunter's canal for a popliteal aneurism for which no definite cause could be assigned, excepting syphilis some years previously. One point of interest was that he had come to the hospital merely

complaining of pain resembling "cramp" in the leg, when the aneurism was found.

Kirmisson, of Paris ⁴¹⁹_{v.21,p.129}; E. R. Kirby, of Philadelphia, ¹¹²_{Dec., '95} and Reboul ³_{Oct., '94} reported successes obtained by means of femoral ligation.

Alessandro ⁵⁸⁹_{p.6,'95} cured a case of popliteal aneurism by forced flexion of the knee. After fifty sittings of two hours each, the aneurism was transformed into a hard tumor and the pain, which had been intolerable, disappeared. The tumor thus formed continued to diminish. The author did not begin the treatment by forced flexion, but by half-flexion, which is much less painful, continued for a short time and gradually increased in length.

In a case reported by Keen, of Philadelphia, ⁹⁶_{Dec., '95} forced flexion was tried, but this, though pushed to the limit of endurance, was not sufficient to arrest the pulsation in the popliteal artery. March 26, 1892, a graduated compress and bandage were applied to the femoral artery without success, and then a shot-bag was used, which only partially arrested the circulation. A three-pad tourniquet was then resorted to, but the discomfort was too great. April 8, the femoral artery was tied at the apex of Scarpa's triangle with silk, the "stay-knot" of Ballance and Edmunds being used. Six days later pulsation was detected in the dorsalis pedis, but none in the aneurism. He was discharged in three weeks. Until March 8, 1895, the patient had been entirely well.

Anterior Tibial.—De Forest Willard ⁹⁶_{Sept., '95} presented a specimen of aneurism of the anterior tibial artery just at its origin where it pierces the interosseous membrane between the tibia and fibula. The history of the case was that of pain following a long and severe walk. The head of the fibula was driven outward forcibly at each pulsation and the bruit was marked.

Cure was effected by digital compression of the femoral artery, pulsation ceasing in forty-eight hours. Treatment was continued as a precautionary measure for another day. Cure was complete, and the relief from pain, which had been very severe, was marked. He died some years later of another disease, when the specimen was obtained and showed obliteration of the lumen.

Multiple Aneurisms.—Jessop, of Leeds, ²_{Nov.17,'94} read an account of a patient in whom, during a period of four years, there had formed four successive aneurisms—at the bend of the left elbow, on the left femoral artery, on the right external iliac artery, and, finally, on the left internal iliac artery. The first three were successfully treated by the Hunterian ligature; the last proved fatal, by rupture which took place before the aneurism was detected.

Souchon, of New Orleans, ¹_{Nov.2,'95} reported the case of a man,

aged 43 years, with two aneurisms of the left thigh,—one, the size of an egg, at Scarpa's triangle, and the other, as large as a cocoanut, at the opening through the adductor magnus. After trial of digital compression, Esmarch's bandage, and Massachusetts General Hospital compressor, the superficial femoral was ligated in the middle of Scarpa's triangle with a double contiguous kangaroo ligature without rupturing the coats of the vessel. Suppuration of the wound with secondary hæmorrhage ensued. The wound was enlarged and the bleeding upper end tied with silk. Pulsation in the lower aneurism stopped, but returned in the upper. Hæmorrhage again occurred, which was stopped by tying both bleeding ends. After a long convalescence, during which the lower sac was opened, the clots removed, and the upper wound re-opened to remove a silk knot, recovery occurred. In another case the author would not use compression, because if operation were required it would have to be done through bruised tissues. The ligature should be applied as close to the sac as the condition of the artery will allow. Should this fail, extirpation of the sac, with or without the use of the Esmarch bandage, is the next thing in order. In cases of high femoral aneurism a provisional ligature should be applied to the artery. In two cases in which the common femoral or external iliac artery was ligated death ensued. The suggestion is offered whether it would not have been better to have extirpated the upper aneurism, which would have cured both aneurisms at once, rather than to have ligated.

An elaborate history of the various cases on record is appended, and the author's case is the only one on record of cure of double aneurism of the superficial femoral artery by operative procedure.

Treatment of Aneurisms in General.—Pierre Delbet²⁰⁹⁰₉₆ gave some new statistics on the treatment of aneurisms. In 1888 he maintained the superiority of extirpation over ligature, and since that time this opinion has been confirmed by experience. In 76 cases treated by incision and extirpation there was but one death, while the mortality remained 8.3 per cent. with ligatures. As regards the frequency of gangrenous accidents, Delbet noted 12 cases, 9 fatal, in 109 treated by ligature, and 7 cases, 4 of which had begun before operation, in 72 operations. Recovery is more complete and less apt to be followed by recurrence when extirpation is employed.

Littlewood²_{Nov. 17, '94} reported two successful cases and argued in favor of this operation for aneurisms affecting arteries of the extremities, as the removal of the sac prevented any chance of recurrence of pulsation and extension of the disease. The artery

is quite as likely to be diseased at a distant point as at one immediately above the aneurism, and the liability of secondary hæmorrhage, if really due to a diseased state of the vessels, is not greater than in the Hunterian operation. The risk of gangrene in popliteal aneurism is probably less.

Ward pointed out that when the Hunterian operation was not successful it failed in one of the following ways: (1) return of pulsation, (2) sloughing or giving way of the sac, (3) gangrene, or (4) secondary hæmorrhage. By extirpation the first two difficulties were done away with. The chances of gangrene were not greater than after the Hunterian operation, and secondary hæmorrhage had been practically done away with by modern methods. He thought extirpation of the sac the most scientific and ideal method. Mayo Robson considers extirpation of the sac as the proper treatment for diffuse aneurisms, but in other cases he prefers the Hunterian plan.

Jessop remarked that, while he agreed with the generally-expressed opinion in favor of excising a diffused aneurism in a limb, he would, nevertheless, hesitate to apply the same treatment to an ordinary case of true aneurism, inasmuch as aseptic ligature had ceased to be attended with the many dangers familiar to surgeons in by-gone times. He expressed himself in favor of the Hunterian operation because he had tied the external iliac seven times, the internal iliac once, the common femoral once, and the superficial femoral he did not know how many times, without ever having encountered secondary hæmorrhage or any of the other dangers.

Jos. Ransohoff, of Cincinnati, ⁴²⁶_{July, '96} in a short paper on the same subject, concluded with the following propositions: 1. Extirpation is the ideal method. It should be resorted to unless there are weighty reasons against it. 2. In aneurisms of the forearm and legs no other method should be adopted. 3. Aneurisms which have suddenly grown large from subcutaneous rupture of the sac and those in which rupture is pending should be subjected to extirpation. 4. In recent traumatic aneurisms the injured vessel should be divided between ligatures; when a sac has formed it should be excised. 5. When other methods have failed, extirpation should be tried before amputation is resorted to. 6. In arterio-venous aneurisms extirpation should be practiced if any operation is indicated. 7. Proximal ligation is to be reserved for cases of idiopathic or spontaneous aneurisms in which the age of the patient or an enfeebled condition from other causes would make a prolonged operation hazardous, and for cases in which the position of the tumor precludes the possibility of extirpation.

In a clinical lecture on aneurism William Thorburn, of Manchester, ²_{Feb. 27, '95} stated that in only a few cases is extirpation not practicable, as in one case of large subclavian aneurism, in which even proximal ligation was not available, or in cases of aneurism of the palmar arch, on account of the importance of not dividing the structures of the hand. But, aside from these exceptions, he advises extirpating aneurisms, and regards the operation as little, if any, more serious than ligation in continuity, and as more satisfactory in its results. The exceptions may be said to be (1) cases in which the proximal side of the sac cannot be reached and (2) cases in which ablation would necessitate serious injury of important structures.

Chaput, of Paris, ¹⁴_{Nov. 24, '95} expressed himself as a partisan of extirpation when this was possible and easy. Ligation is no longer admissible, it having been demonstrated that it exposes the patient to the risks of gangrene, rupture, and recurrence of the aneurism, while adhesion of the sac to the neighboring nerves often causes violent pain. Extirpation does not present the same inconveniences, although it is but just to say that the operation is very difficult and very dangerous in certain cases. Generally speaking, total extirpation should be attempted, ligation and section of the artery upward and downward simplifying the operation. It is better to dissect out the sac. If the sac be opened by accident, and hæmorrhage cannot be arrested, the operation may be terminated by packing, which will be sufficient to secure hæmostasis. Chaput concluded by stating that extirpation was the ideal measure, but that, if it were impossible, very difficult, or dangerous, incision might be tried after tying the artery above and below.

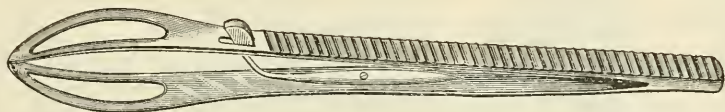
D. D. Stewart, of Philadelphia, ⁹⁹_{May 29, '95} employed electrolysis in the treatment of sacculated aneurism. He inserted ten feet of gold wire of sufficient calibre to form spirals in the centre of the cavity, the current being closed without interruption for seventy-five minutes. Before the expiration of half an hour the needle was able to stand up in the cavity without support. The operation caused no pain. Three weeks afterward the operation was repeated because the upper part of the sac was not sufficiently occluded. At this time but two and a half inches of wire could be inserted.

E. Mansel Simpson ²_{July 27, '95} has sought, in the artery-forceps illustrated in the accompanying wood-cut, to obviate a defect which he finds in nearly all these instruments. In tying an artery it is desirable that the assistant's fingers should be out of the way, but in the ordinary pattern, roughened for only half the length of the shaft, it is difficult to get a firm grip unless the finger

and thumb are placed low down on the roughened portion, when there is the further objection that there is considerable risk of loosening the grip. In the forceps designed by Sympton²⁰⁹²₉₆ the sides are roughened for nearly three-quarters of their length. This improvement also makes the forceps more convenient for use as tenacula for dealing with small tumors.

Arterial and Venous Disorders.

Hamant, of Nanterre,¹¹⁵³_{Oct.12,'95} had occasion to observe, in the course of an operation performed by Rémy, a case of complete obliteration of the femoral vein and artery and the internal saphenous vein at the base of Scarpa's triangle, occurring in the course of tuberculosis of the inguinal glands. The author had been unable to find records of any similar case in the literature. Instances of more or less complete obliteration of even important arterial or venous trunks, following continued compression along their course, are doubtless far from rare; but such obliteration of a vessel usually occurs slowly and is accompanied by more or less marked



ARTERY-FORCEPS. (SYMPTON.)

British Medical Journal.

symptoms of compression which aid in the formation of a diagnosis. In the author's case, however, the obliteration occurred within a few weeks, possibly within a few days, and did not give rise to the slightest symptom that would lead to the suspicion that the entire circulatory system of the anterior region of the thigh and the greater part of the leg and foot was suppressed.

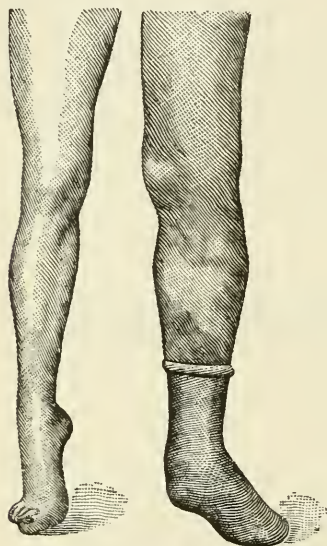
A month after operation no circulatory disturbance existed. The wound was on the way to cicatrization, and when this should have been finished the patient would probably have as good use of the right as of the healthy left leg.

A case of aneurism, varicose veins, and eczema was reported by C. H. Merz, of Sandusky, O.,⁶⁶³_{Oct., '95} in a man of 24 years, slight in build, of pale complexion and tubercular diathesis. When a child his leg was noticed to be enlarged. As he grew older the enlargement became more pronounced until, when seen, he had great difficulty in walking. By actual measurement the affected limb has increased in length as compared with the other. This would be a questionable statement did not the actual measurement

prove it to be a fact. The measurements of the limbs are, comparatively:—

	Right.	Left.
Ankle,	8½	11
Calf of leg,	12	16
Knee,	13½	16½
Middle of thigh,	16½	20
Thigh,	19	29½

The position shown in the illustration is the natural one assumed by the patient, and goes to prove the truth of the statement that the left leg is the longer. The entire limb is a dark purplish-blue color; the eczematous patches are elevated one-fourth of an inch above the skin and are very dry, thick, and scaly.



A CASE OF ANEURISM, VARICOSE VEINS, AND ECZEMA. (MERZ.)

Medical Mirror.

Arterio-Venous Aneurisms.

Internal Carotid and Cavernous Sinus.—G. E. Williamson, of Newcastle-upon-Tyne, ^{Oct. 13, '94} reported a case of aneurismal varix of the left internal carotid artery and the cavernous sinus in a miner aged 53 years. In the year 1870 the patient's head was crushed in a coal-mine between a pit-tub and the roof. As soon as he recovered himself after the accident he noticed a pulsation between the nose and his left eye and heard a loud noise in his head which has been present ever since. He hears it, however, in the left ear only, as

the hearing of the right ear was lost by reason of the accident. A few weeks later a swelling over the left eye gradually formed, which increased toward the nose and the eye slowly protruded, but, excluding the first few months after the accident, the size of the swelling and the pulsating noise in his head have remained practically unaltered. He has enjoyed good health since the accident and has gone on regularly with his ordinary work in the mine.

Williamson considered the case to be a small communication between the internal carotid artery and the cavernous sinus, caused by a laceration of the artery from a fracture of the base of the skull. The interest of the case lies in the well-marked nature of

the disease, in its comparative rarity, and in the fact that it has remained unaltered for twenty-three years.

Carotid and Internal Jugular.—S. Duplay¹¹⁵³_{Dec. 14, '96} lectured on a case of arterio-venous aneurism of the common carotid artery and the internal jugular vein in a man who had received a knife-wound in the sterno-mastoid region about twelve years before, the blow having been directed from below upward, his antagonist being of shorter stature than himself. The abundant hæmorrhage



ANEURISMAL VARIX OF THE LEFT INTERNAL CAROTID ARTERY AND CAVERNOUS SINUS.
(WILLIAMSON.)

British Medical Journal.

following had been arrested by the patient himself by means of digital compression, and afterward by an antiseptic compression bandage, in hospital. During a stay of one month the hæmorrhage had not recurred, and the patient was about to be dismissed as cured, when Labbé, in examining the cicatrix of the wound, recognized the formation of an arterio-venous aneurism. Duplay proposed to operate by quadruple ligature, which, according to the statistics of Delbet, has given the best results.

Aorta and Innominate.—An instructive case of traumatic

arterio-venous aneurism of the arch of the aorta and the innominate vein was reported by Colzi.³⁷⁶
Feb., '96 The patient was a man, 37 years of age, who was stabbed just below the clavicle, eleven years previously, the knife grazing the sternum. He was unconscious immediately after the accident, but did not lose a very large quantity of blood and recovered after rest in bed for about a month. Four months later, while at work, the left half of the face and the left arm swelled up. Two years after the accident there was, in addition to the swelling, a dusky-red coloration of the skin in these regions, a non-pulsating exophthalmos, and dilated pulsating veins on that side, with a distinct arterio-venous aneurismal thrill. On auscultation, the thrill was most distinct over the manubrium sterni, and could be followed down the internal jugular and left brachial veins, and over the skull in the course of the sinuses. The man was unable to do heavy work and the arm increased greatly in size, but otherwise he was not much troubled by his condition. He finally died of thrombosis. Post-mortem examination showed that there was an opening about seven millimetres in diameter in the arch of the aorta, between the points of origin of the carotid and the innominate arteries, which communicated directly with the left innominate vein, which was dilated at this point to the size of an orange, with the usual changes in the veins beyond. There was acute cerebral œdema. Colzi thinks that the blood from the aorta entered at once into the jugular vein, and, distending it, caused the flow of arterial blood to be kept within bounds by pressing upon the edges of the wound in that vessel. Recovery and long survival after such an accident are remarkable.

Subclavian Artery and Vein.—According to George Wedekind,⁶⁹
No. 10, '95 fourteen cases of arterio-venous aneurism of the subclavian have been published. The fifteenth case, observed by himself, presented two special features,—there was no syncope at the time of the accident and, seven months after the development of the aneurism, no functional trouble had occurred. The delicate question in the treatment of a wound of the subclavian is when to ligate. Wedekind advises waiting if the primary hæmorrhage be moderate, if it be likely that the artery and vein are wounded at the same level, if there be no secondary hæmorrhage, and if the patient can be kept under medical supervision.

Brachial Artery and Vein.—A case of arterio-venous aneurism of the forearm following a bullet-wound was reported by Bousquet, of Clermont-Ferrand.¹⁴
Nov. 20, '95 Ligation of the brachial artery was refused by the patient, and three months later a large tumor was seen on the lower part of the arm, elbow, and part of the forearm. It measured forty-two centimetres on the wounded side

at the elbow and twenty-five centimetres on the diseased side. The mass was smooth, hard, without pulsation or murmur, the movements of the arm were impeded, and the pain was violent. The patient was anæsthetized, an Esmarch bandage applied, and a longitudinal incision made in the anterior part of the tumor. The brachial artery was tied and the mass carefully dissected out, leaving a triangular cavity the base of which was formed by the interosseous ligament and the sides by atrophied muscular masses. A month after operation cicatrization was complete and the patient returned home. Since then motion had returned and recovery was complete. N. Iwanow⁸⁵⁹_{Nov. 45, 47, '94} reported a case of arterio-venous aneurism of the axillary artery and vein.

Gluteal Artery and Vein.—Delaup¹²_{Nov., '95} reported the case of a strong, well-developed, seemingly healthy negro, 21 years old, who complained of a pulsating growth of the right buttock, which disabled him from hard work. On examination an irregularly defined, fluctuating, elastic, pulsating tumor, unattended with inflammatory symptoms, was found about an inch above the right gluteal fold and nearer the median line. A diagnosis of arterio-venous aneurism was made and an external operation undertaken, which was, however, not successful, from failure to secure the gluteal artery. Extra-peritoneal ligature of the internal iliac artery was proposed for a subsequent occasion, but the patient failed to put in an appearance.

Femoral Artery and Vein.—T. A. Hedlund⁶⁷³_{Jan., '95} described a case of arterio-venous femoral aneurism in a laborer who cut himself on the inner side of the right thigh for a distance of about three inches. There was profuse hæmorrhage and the man became unconscious. The thigh was tied with a towel. Two weeks after the accident an irregular, movable swelling about eight centimetres in length appeared on the inner surface of the thigh. This was extirpated and the patient recovered. The author collects eighteen similar cases from the literature, in which complete extirpation of the aneurism was successfully performed, no gangrene or secondary hæmorrhage following the operation. He is of the opinion that when immediate treatment is indicated, direct and indirect digital compression should be combined. In cases in process of development four double ligatures should be employed, both the lacerated veins and the arteries being tied. The same method is recommended in cases where the aneurismal sac is fully developed, on the ground that by the use of these ligatures secondary accidents are prevented, the establishment of the collateral circulation being made easier. (Report of Corresponding Editor Eklund, Stockholm.)

Zoege v. Manteuffel, of Dorpat, ³³⁶_{July 6, '95} reported a case of traumatic ossifying arterio-venous aneurism of the deep femoral artery and vein.

Treatment of Arterio-Venous Aneurisms in General.—In the discussion of a paper by John B. Roberts, of Philadelphia, ⁹⁶_{Sept., '95} who recorded a case of varicose aneurism of the thigh treated by transperitoneal ligation of the external iliac artery, John Ashhurst, Jr., stated that in arterio-venous aneurisms no operation, as a rule, was needed, since the condition is not progressive. In neither of the two cases of varicose aneurism which he had seen was any operation required. In one, a case shown him by Osler, of Baltimore, the history was that the patient had a pointed lead-pencil in his vest-pocket, and that by a fall the pencil was driven into his axilla, wounding the artery and vein. Subsequently a pulsating sac developed, but, as this was stationary when he saw the patient, he advised against any operation. When an operation for varicose aneurism is required it is proper to ligate both ends of the artery, but not the vein. He did not think it to be good practice in these cases to tie the vein as well as the artery.

Cirroid Aneurism.

W. S. Forbes, of Philadelphia, ⁹_{June 15, '95}; ⁸⁰_{Nov. 15, '95} operated successfully for a large cirroid aneurism of the scalp in a man who entered the Jefferson Hospital on January 8, 1894, giving a history of having been struck on the head when 13 years of age. The skin was not torn, but a large lump appeared in a few moments. There was considerable pain, which continued for a month, and was increased on handling. The tumor varied in size from time to time. At the age of 16 years the frontal veins enlarged, and soon after this the veins on each side of and behind his head began to enlarge and become tortuous and the expanding tumor to throb.

Forbes found a large pulsating tumor, somewhat flattened, and more than two inches in diameter, extending from the middle of the interparietal suture backward to near the occipital crest. This was the seat of the early trauma. Radiating from the tumor were large veins which extended backward, forward, and into either temporal region. They were prominent, tortuous, and pulsating near the tumor. There was a decided bruit in the tumor. The veins and the tumor could be obliterated by gentle pressure applied to the entire scalp. There were eight arteries supplying the tumor, and when all were compressed at the same time there was no pulsation, the bruit could not be heard, and the tumor and the veins became at once less prominent.

The control of the blood-supply was successfully made by

acupressure-pins applied to the external terminal branches of the occipital arteries, the terminal branches of each temporal, and the two supra-orbital branches of the ophthalmic arteries. The pins were withdrawn in six days. For two days no pulsation could be discovered. In the third week after the operation of acupressure, however, slight pulsation was observed. In view of this condition a crucial incision was made directly over the scalp, and the vascular tissue entirely removed between the skin and the periosteum of the flat bones. This was accomplished by pressure on the several arterial trunks, and the incision made over a large plane of vascular plexus. The hæmorrhage, which was quite profuse, was readily controlled by forceps and animal ligatures. The margins of the flap were brought together, proper compression applied, and over all a wad of sterilized gauze was held in place by a bandage. Complete recovery followed.

A case of cirroid aneurism with ligature of the common carotid artery was reported by Wm. D. Hamilton, of Columbus, O. ¹_{Nov. 3, '94} Decided improvement followed and up to the time the paper was written there had been no indication of recurrence, notwithstanding the patient's occupation necessitated heavy work.

Varicose Veins.

Pathology.—In a study on the histology of varices Menahem Hodara ²⁸_{B.20,H.1,2} states that the increase of blood-pressure in the veins first causes dilatation; the elastic tissue of the wall resists this excessive pressure, and hypertrophy and hyperplasia develop, but in spite of this the vessels dilate. Later on the muscular tunic also presents hypertrophy and hyperplasia, as does also the connective tissue of the median and internal coats in many cases. Thickening of the walls results, the elastic tissue passing through all the membranes in the form of indurated lamellæ. To external hypertrophy of the vein is added the formation of new tissue in the internal coat, the elastic tissue of which, consecutive to hypertrophy and hyperplasia, forms resistant layers. In spite of this internal hypertrophy, the walls may become distended, and under such conditions thrombus may form, after which there is no longer increased tension; so that the lesions due to resistance give place to atrophy. The muscular and elastic tissues disappear to a great extent, first in the internal and middle coats, and partly also in the external coat.

Treatment.—The treatment of varicose veins by ligature of the internal saphenous vein was discussed by Winiwarter ²⁹³_{Nov., '94} ⁸⁰_{Mar. 15, '96} of Liège, who shows that by multiple peripheral ligature or excision of the veins the general cause of dilatation is not affected

and the recurrences are frequent. Trendelenburg's method however, marks a distinct advance in the treatment of this affection, since radical cure is accomplished by it. This consists in ligation of the internal saphenous vein, into which all the peripheral veins empty. Trendelenburg has shown that, because of insufficiency of the valves of the saphenous vein, the blood which circulates in this vessel, together with that in the femoral vein and external iliacs, a column is formed which keeps up a constant high pressure in the veins of the leg when the patient is standing. From this etiology of the affection radical treatment is suggested. In the operation Esmarch's tube is applied to the extremity of the thigh, the operative field is carefully cleansed, and the internal saphenous vein is exposed at the junction of the upper and middle third of the thigh by a longitudinal incision over the sartorius muscle. After being freed it is divided between two ligatures; the wound is then sutured and a very careful antiseptic dressing applied. The whole limb is then enveloped in cotton, bandaged firmly, and kept immobilized for eight to ten days. Sometimes the more peripheral enlarged veins are also removed. Rebellious varicose ulcers quickly yield to this treatment.

G. Perthes⁶⁹_{No. 16, '95} used Trendelenburg's method of ligation of the saphenous vein in the upper portion of the thigh in 41 cases of varicose veins, 32 definite recoveries being obtained. Several relapses occurred through the vein becoming permeable soon after ligation, and from this fact the author recommends resection of a few centimetres of the vessel. Faisst⁷⁶¹_{B. 12, H. 1} reports 25 cases treated in the clinic at Tübingen by this method; of these, 11 were seen at the end of six months and all showed the good effects of the operation as regards the disappearance of pain and discomfort. Cure had been maintained for two years in 2 cases, from one to two years in 7, and less than a year in 3; but in only 2 cases had the varices entirely disappeared.

W. Thornley Stoker, of Dublin,¹⁶_{Mar., '95} in discussing the treatment of varicose veins, advocated total abolition of the ligation, which he condemned as dangerous and useless. His method of treatment is as follows: The patient is kept in bed for two or three days to allow the veins to contract; the bowels are well cleansed and the skin of the parts to be operated on is rendered aseptic by scrubbing with soap and water, washing with ether, and applying a dressing of 1 to 40 carbolic-acid solution, covered with mackintosh, and changed two or three times in the twenty-four hours.

At each place where it is thought necessary to divide the veins, an incision about half an inch long is made in the vertical axis of the limb, the superficial fascia divided with an oculist's scissors,

the vessel lifted from its bed, a quarter of an inch cut from its length, and gentle pressure applied with a sponge. When this procedure has been repeated at all necessary points, the part is irrigated with sublimate solution, flat compresses of sterilized gauze applied to each incision, a dressing placed over them, and the limb bandaged from the toes to above the seat of operation. The patient is kept in bed and not allowed to rise from the horizontal position for a week. The essence of this method is that, while a ligature is not employed, the wound is treated as an open one, and no sutures are introduced into the skin. The advantage is that the danger of infecting the vein is lessened, the possibility of a clot of blood forming subcutaneously, with its attending risks and inconveniences, is avoided, and a rapid as well as a safe recovery is provided for. It should be remembered that, owing to the low tension of the blood in the veins, very slight pressure is required to control hæmorrhage from them, and that, therefore, thick compresses and tight bandages subsequent to operation are to be avoided; they are not required, and only serve to impede capillary circulation and delay repair. If anæsthesia is required, Stoker prefers a general anæsthetic.

The "garter" incision for the cure of varicose veins of the leg was proposed by D. M. Moir, of Calcutta,¹⁰⁵⁵
Dec. 16, '95 who describes the operation as follows: A circular incision in the upper third of the leg, through the skin and areolar tissue down to the deep fascia, cuts across all the subcutaneous vessels. Ligature, above and below, of the cut ends of these vessels effectually prevents the return-flow of blood through these superficial channels. The result is that all the venous circulation below the level of the circular incision is driven into the deep veins beneath the deep fascia, in the intermuscular septa, and within the muscles themselves. In this manner the blood is returned in channels that are much better supported amongst the deeper tissues, and it is also propelled upward to some extent by muscular contraction.

The best site for operation is in healthy skin an inch or two above the thickened, infiltrated, and pigmented skin of lowered vitality caused by the varicose veins. The operation is rather tedious, but it is considerably shortened by using a continuous suture instead of interrupted ones. When there are ulcers to be scraped or the edges of ulcers to be dissected up, this should be done before the circular incision is made; otherwise there may be troublesome venous oozing from the ulcers. The results of five operations performed on three patients were excellent. Excision of the internal saphenous vein was performed by Rioblanc,¹⁴
June 2, '96 for varicose ulcers with complete success.

Delore, of Lyons, ^{175 673}_{Apr., '90; Oct.} gives the statistics of 164 cases of varices treated without a single failure by means of injections of an aqueous solution containing 1 part of iodine and 9 parts of tannin, marking 18° Baumé. He injects 8 drops of this solution, by means of a Pravaz syringe, into the orifice of a short cannula inserted into one of the principal varicose confluent. During the operation a rubber tube is placed at the root of the thigh. The patient stands during the injection, which is given without anaesthesia, and is repeated when necessary. The veins are then compressed ten centimetres above and below the puncture, the limb is wrapped in boric-acid cotton, and the patient made to lie down and to keep rigorously in this position. An hypertrophic phlebitis is thus brought on, with thickening of the venous walls and consequent resistance to dilatation. Delore declares the possibility of embolism to be purely theoretical, and not borne out by facts.

[Intra-venous injections of coagulating fluids have been abandoned as dangerous and uncertain.—C. F.]

Varicose Ulcers.—The treatment of varicose ulcers by compression and metallic plaques was considered by Ascornet, ²⁰⁰⁰_{'95} who employed this method, already known, in various forms of deep and superficial varicose ulcers. In the superficial form he first washed the diseased surface and its edges with boric-acid solution or corrosive sublimate 1 to 2000, and then applied a sheet of zinc a tenth of a millimetre thick and overlapping the edges of the ulcer about one centimetre. He then fixed it in place with a band of red rubber five centimetres wide and five metres long, wrapped about the limb, beginning at the foot and extending to below the knee, and moderately tight. The patient was kept lying down while this was applied. This was the daily dressing. In the evening the rubber band was removed and washed, the metallic plate taken off and cleansed, the wound disinfected with an antiseptic, and the band re-applied and held in place by a band of linen or flannel. The patient was able to walk and carry on his usual occupation. The pain, swelling, and œdema rapidly diminished.

In a case of deep varicose ulcer the treatment was somewhat different. Instead of the zinc a piece of tin-foil was folded two or three times and molded over the ulcer, a piece of cotton placed over it, and the same bandage as above applied. As soon as the loss of substance had been filled out, zinc was substituted for the tin-foil. The curative effects of the treatment were first apparent in the formation of a white line of cicatrization on the edges of the ulcer, weakening of the edges, the appearance of granulations at the base, and the diminution of secretion. Recovery was effected by the author in three weeks by this plan.

PLASTIC SURGERY; SURGICAL DISEASES OF THE JAWS AND MOUTH.

BY THE CENTRAL EDITORIAL STAFF.

SUBMITTED FOR COMMENTATION TO

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PLASTIC SURGERY.

Skin-grafting.

A CONTRIBUTION to the subject of skin-transplantation, according to Thiersch's method, was made by Auerbach, Jottkowitz, and Schultheiss, ⁴_{Jan. 28, Feb. 4, '95} based on one hundred and sixteen cases. They abandoned curetting of the surfaces for which the flaps were intended, and, in order to lessen the pain occasioned by the grafting process on a limb, applied a constricting bandage above, which also prevented the flaps from being bloody. They substituted dry iodoform gauze or linen impregnated with boric-acid ointment for the wet dressing of physiological salt solution. They found, contrary to Urban, ³⁰¹_{11.34} that the grafts adhered perfectly to tendons deprived of sheaths and to bones deprived of periosteum.

Thiersch's method, according to J. C. Oliver, of Cincinnati, finds ⁵⁹_{June 8, '95} its greatest efficiency in cases where tumors are removed that are so large that the flaps cannot be brought together, leaving a large, raw surface; replacing cicatricial tissue, and the removal of birth-marks, such as port-wine stains, etc. The operation should be carried out under the strictest aseptic principles. Granulation should be scraped away, and if an old ulcer it should be sterilized several days beforehand and all oozing stopped.

William B. Hopkins ¹¹²_{Apr., '95} showed two cases, before the Philadelphia Academy of Surgery, of granulating surfaces cured by transplantation of large flaps. One of the cases was a man, aged 32, with a granulating surface, from laceration, extending from the middle of the arm to the middle of the forearm,—about ninety-six square inches. It was covered by a vertical flap five inches wide and nine inches long, consisting of skin and superficial fascia, the base of which occupied the upper left pectoral region and the

edges of which were nearly parallel. The limb was retained in the Velpeau position. At the end of four days the basal attachment was divided; some epidermal sloughing took place, but the result was excellent.

John Dunn¹⁰⁹_{July, '96} says that there is one point in regard to the transplantation of pieces of skin which, although it may be widely practiced, has not received in medical writings the emphasis it deserves. The piece of transplanted skin should not merely be laid upon the surface where it is expected to grow, but should be sewn there. Where this has been done he has found that comparatively large pieces of skin—*e.g.*, a piece three-quarters of an inch wide by one and one-fourth inches long—may be transplanted, and will unite as a whole to the surface beneath; provided, of course, that the surface upon which the transplanting is done is in a healthy condition.

[The severe pain caused by the removal with scissors of the small pieces of skin required for grafting purposes may be prevented by first freezing the spot with an ethyl-chloride spray.]

H. B. Granbury, of Austin, Tex.,⁶⁴⁵_{Sept., '94} suggests that, in making callous grafts, the part from which the graft is to be taken be given frequent and prolonged baths in a strong sodium-chloride solution of hot water, accompanied by firm, but gentle, friction. This suggestion is based upon the physiological effect of friction, which produces primarily an anæmic condition from pressure rapidly followed by hyperæmia, a more lasting state and due to an impress upon the vaso-dilators. This dilatation of the vessels not only invites an increased supply of blood to the part, but accelerates the blood-current, thereby promoting, in a twofold way, the nutritive supply to the parts, necessarily increasing the already-increased vitality of the graft. Rapid communication between the graft and the fresh wound or granulating surface is established, thus throwing the graft but a remarkably short time upon its own incorporated vitality for existence.

Zera J. Lusk, of Wyoming County, read a paper before the New York State Medical Association¹_{Dec. 21, '96} on a new and original method of obtaining material for skin-grafting. The case in which this method had first been employed had been one of scald from falling into a vat of boiling brine. More than two-thirds of the surface of the body had been involved, yet the patient had reacted well. As there had been numerous patches of exfoliated epithelium, the result of vesication, it had occurred to Lusk to try to make use of them for skin-grafting.

This exfoliated skin had been nearly five weeks separated from the cutis. A piece an inch square had been softened and

sterilized in warm boric-acid solution, divided into twelve pieces, and applied to a granulating surface on the left thigh. Seven out of these twelve grafts had rapidly developed into vigorous islands of skin. The treatment had been continued according to this plan, and in about six weeks all except a very small granulating area had been completely healed. There was a marked absence of cicatricial contraction and the scar-tissue was firm and well nourished. Lusk said he believed that, if the skin were kept at a temperature of between 40° and 90° F. (4.4° and 32.2° C.), the vitality could be maintained almost indefinitely. The best results were obtained from the thin, transparent epithelial tissue. It was immaterial whether one or both edges of the skin remained attached,—indeed, it was not necessary, he said, that it should have any attachment. Experience had shown that grafts from the plantar surface of the feet and the application of large pieces of skin were followed by negative results. This new process of skin-grafting he had extended somewhat by raising a blister with cantharides and using the exfoliated epidermis for the grafts. This method had proved very successful in a case of old varicose ulcer.

Skin-grafting for malignancy of the orbit formed the subject of a paper by F. B. Tiffany, of Kansas City, ⁴³⁰ Sept., '95, illustrated by plates of cases treated. E. K. Dunham, of New York, ²²⁴ Sept. 7, '95, observed a case of epithelioma following skin-grafting.

Animal Grafts.

While fully appreciating the value of Thiersch's method of skin-grafting, Alexander Miles ³⁶ Sept., '95 pointed out that it has the drawbacks common to all operations involving the use of a knife on the person of the patient and the administration of an anæsthetic. These can be overcome by employing the skin of young animals killed for the purpose. He has used dogs, rabbits, kittens, and frogs as the donors of skin, the best results having been obtained from dogs and the least satisfactory from frogs. Young animals are always used. The ulcer is prepared, as in other skin-grafting procedures, by being made aseptic and by being brought into a healthy state as regards its granulations, which must be neither redundant nor œdematous. The grafts are placed on the surface of the granulations without previous scraping. The preparation of the grafts consists in killing the animal and, after shaving its abdomen, dissecting up the whole skin, leaving behind the subcutaneous tissue. It is floated out in warm boric lotion and cut into pieces varying in size according to the raw surface to be covered in (from one inch by one-half inch to six inches by one inch).

These are firmly pressed into the granulating surface, close up to the margins and edge to edge. A dressing of protective, gauze and wool, with a splint, is then applied. The after-dressing is the most important part of the proceeding. It should be left undisturbed for at least forty-eight or seventy-two hours, and then the dressing should be changed with the utmost gentleness and caution. Subsequent dressings may be necessary every day, or every second day, according to circumstances. A graft which dies should be removed at once, to avoid septic changes taking place. Apparent sloughing of a graft is occasionally observed. It is due to the superficial layers of the skin being thrown off, the more vital, deep layers living and growing. When pustules form on a recently-grafted surface they should be punctured at once and covered with an antiseptic dressing. Granulations sometimes grow up through grafts, destroying them. These are best removed with a sharp spoon. In all cases special precautions are necessary to prevent movement of parts until the grafts have fairly established themselves.

Details of ten cases treated by grafting from animals were given by Miles. The results of the grafting in four were perfectly satisfactory. Two patients recommended for amputation, and anxious to have it done, left the hospital with useful limbs. In another an ulcer, which had resisted ordinary treatment for eight months, was healed in a week. In the fourth case an ulcer, sixteen inches by twelve inches, was reduced to the size of a shilling-piece, when it was attacked by erysipelas, to which the patient succumbed. Four other cases were only partially successful,—some of the grafts taking, others failing. Two cases derived no benefit whatever from the proceeding. The resulting scars are stronger and show less tendency to contract than those obtained by any other method of grafting. Pigment speedily disappears, and no hair, sweat, or sebaceous matter appears on the new skin.

George Seeley Smith, of Providence, R. I., ⁹⁹_{Jan. 24, '95} reports a case in which the frog-skin "took" even better than the human skin. A child 5 years of age was burned over a large area of the trunk, face, and neck. When first seen, four weeks after the accident, the entire surface was covered with healthy granulations that bled freely upon the slightest touch, and the fold of the axilla was already firmly adherent; so that the arm was firmly bound down. The adhesions were broken up under ether. Owing to the large surface, healing by granulation would not only take many months, but would result in considerable deformity. To begin with, twenty pieces of frog-skin, each a quarter of an inch

square, were placed in two rows of ten each, each graft being separated from its neighbor by a space of half an inch. In two days the skin had become identified with the granulating surface, and in five days the grafts had lost their original color, and each had sent forth embryonic epithelium meeting that of its neighbor. It was found that the comparatively thick skin from the back took more satisfactorily than that from the belly or leg. The method used in dressing was as follows: The surface was first cleansed by irrigating with a warm solution of carbolic acid (1 to 40), and after the detritus had been entirely cleared away the parts were washed with sterilized water. Each graft was then firmly pressed into the granulating surface. Following this, a dressing of boric acid and vaselin (1 drachm to 1 ounce—4 grammes to 30 grammes) was spread upon strips of compress cloth and applied so as to fit the parts snugly. Outside of this was placed sterilized gauze, and, as a final step, the roller bandage. The parts were all grafted in during the course of seven weeks. The skin, however, was soft and immature and required constant care and dressing for three months after.

Amat ^{243 1170}_{Mar., '95; Oct.} tried the inner layer of the shell-membrane of a hen's egg and met with a certain degree of success, particularly in cases of extensive burns. The suppuration was suppressed, and the region upon which the transplantation was to take place was protected from the air with four or five layers of carbolized gauze. As fresh an egg as it was possible to obtain was broken, following the long axis. At the large end of the egg there is a small air-chamber between the two layers; here small pliers were applied, and narrow bands of the inner leaf drawn out in portions four or five millimetres long; these were cut into equal lengths and deposited directly with the point of a scissors, to which they usually adhere. The grafts were placed twelve to fifteen millimetres apart, and covered with a piece of tin-foil about one cubic centimetre square, a few layers of carbolized gauze being placed over all. The external application was changed every three or four days.

Bone-grafting.

Mossé, of Toulouse, ¹⁴_{Oct. 30, '95} who had previously established by experiment the fact that bony re-implantation and transplantation after trephining of the skull could become true grafts,—even heteroplastic transplantations,—communicated to the Paris Academy of Medicine some new experiments with heteroplastic grafts, which he had made in conjunction with Tourneux. These new experiments, made on the monkey, cat, and rabbit, demonstrate

the reality of the graft and its mode of nutrition, but also show some modifications indicating diminished vitality of the transplanted portion. They establish (1) the possible fusion of the two parts of the graft through bony layers of new formation between them; (2) the close anatomical relation between the bony layers of the graft and those of the skull. Mossé stated, however, that, though such transplantations may become true grafts, the result is not constant, even in animals.

Barth⁷⁶⁸_{B.17} says that the apparent vitality of the fragments implanted is frequently only apparent. In reality they often undergo anæmia-necrosis and are substituted by new bone-tissue. This may not be apparent to the naked eye, but the microscope shows it to be the case. The same is true in cases of fractures. Dead bone seems to answer the same purpose as the living if it fill the defect properly, the formation of bone in each case taking place throughout the implanted portions of bone. With decalcified bone the case is different,—the deposition of bone takes place only on the surfaces of fragments. Bone in which the animal matter has been destroyed by heat also answers the same purpose. The beneficial influence seems to depend upon the presence of the calcium salts. The author states that calcined bone placed in the soft parts, or even in the abdominal cavity, is followed by bone formation.

Crickx and Van Engelen, of Brussels,⁸⁶⁸_{Sept.15,'94} have made an exhaustive experimental study of the growth of bone, and find that the use of sponge-grafts gives negative results, but that the transplantation of decalcified bone not only hastens regeneration, but also regulates the growth of the bone. It serves as a support to the periosteal covering, keeping it in position, and thus allowing the new bone to take the size and appearance of the primary bone.

From a study of the literature and from clinical experience, A. Heydenreich, of Nancy,³_{Feb.6,'96} concludes that the filling of bone-cavities with foreign substances (as with plaster made into a paste with 5-per-cent. solution of carbolic acid, as recommended by Dreesmann,³_{p.524,'92}) is a method of considerable value. The indications for its use, however, are as yet limited; only small cavities, easily disinfected or naturally aseptic, are suitable. Under these conditions, however, cure is hastened and rendered more permanent, the form and solidity of the bone are restored, and all deforming cicatrices are avoided.

D'Ambrosio⁵⁸⁹_{Mar.16,'95}²_{Apr.27} used sponge-grafting with success in the case of an obstinate ulcer of the leg secondary to severe fracture. The patient was a boy, aged 9, who had fractured his tibia and fibula and so injured the soft parts as to raise the question of

amputation; however, it was decided to save the limb, and the fracture was completely united. There remained, however, over the external malleolus, an ulcer ten centimetres by eight centimetres, which resisted all methods of treatment; so that finally the author resolved to try sponge-grafting. About thirty pieces of *Spongia officinalis*, from one to three millimetres broad and two millimetres thick, were planted on the ulcerated surface at not more than two centimetres distance from each other, and kept in position by oiled silk; over this was placed a gauze dressing. Every antiseptic precaution was taken. At the first dressing, two days after, the suppuration was found to be less, the luxuriant granulations were reduced almost to the level of the margins of the wound, and at the edges of the wound there was a halo of young epithelial tissue. Dressings were changed about every two days, and each time the ulcer was noticed to be steadily improving; so that in a little less than four weeks the large ulcer was cured and in its place was formed a hard, resistant, reddish cicatrix. The sponge may act as a kind of scaffolding upon which new vessels and new granulations build, and upon which processes of epithelium from this margin extend. It also acts as an absorbent filter for the pus which bathes the ulcer and as a slight stimulant to the ulcer itself. D'Ambrosio finds that the pieces of sponge are not organized, but are split up by some imperfectly understood chemical process and carried into the circulation through the lymphatics. In sections of cicatricial tissue where sponge-grafting had been used he was never able to find any trace of the sponge.

Rhinoplasty.

H. L. Smith, of Boston, ⁹⁹_{May 16, '95} published a series of cases illustrating the plastic surgery of the nose and palate, among them one of prominence of the nasal bones following fracture, treated by a skin-flap raised to the root of the nose, chiseling off the projecting bone, suturing the loose cartilage, and straightening the septum, leaving an imperceptible scar. The procedure of freeing the alæ in order to obtain a better access to the nasal cavity is an old expedient; but the writer has seen no statement of its use in combination with an incision across the septum, with the complete flaying of the nose, for the purpose of gaining access to the nasal bridge.

T. Jonnesco, of Bucharest, ¹⁰⁴³_{Dec. 1, '95} reported a case of total rhinoplasty by the Italian method modified. The patient was a young man, 25 years old, affected for five years with diffuse hypertrophic acne of the nose, which had resisted numerous scarifications. The author performed total decortication of the nose with

the bistoury, the edges of the nose being preserved. Hæmorrhage was abundant. Most of the vessels were twisted, but a few required ligature. Rhinoplasty was then proceeded with, the head having been the day previously immobilized in a silicate apparatus. The flap was taken from the front of the arm and was V-shaped, with the lower angle rounded and nine centimetres long. It was attached to the nose everywhere, except at the left nostril, by sixteen sutures. Dry iodoform-gauze dressing and absorbent cotton were used, the arm being fixed on the head by a large plaster apparatus surrounding the face, leaving only an orifice for the right eye. On the seventh day the apparatus was removed and the flap found to have taken along the entire line of sutures. The skin was sensitive. The pedicle of the flap was cut and fourteen sutures used to complete its attachment to the nose. F. B. Lund⁹⁹_{Sept. 13, '94} operated on a case of acne rosacea hypertrophica in a man 60 years of age. The cosmetic results were gratifying to the patient.

Martin, of Lyons,⁶_{Jan. 5, '95} has invented a metallic substitute for the nasal bones, the absence of which is so often the cause of failure in the Tagliacotian operation. To this bridge is fixed a metallic tripod, whose office it is to support the flaps. Unfortunately, the excellent result at first procured is finally discounted by the suppuration excited by the tripod, which is then eliminated. Chaput⁴¹⁹_{Dec. 26, '94} avoids this *contretemps* by plunging the extremities of the tripod into holes bored in the surrounding bone. This is done in order to place the ends beyond the reach of suppuration germs. In this way the apparatus is tolerated for ten or fifteen months without inconvenience. Chaput employs platinum for the fashioning of the tripod support, but he thinks that the less costly silver-gilt would do as well. Of two cases operated on by him one was quite satisfactory, the restored organ being æsthetically a good imitation. The second case was a comparative failure, the tripod having been made too large.

Lewis A. Stimson, of New York,⁹⁶_{June, '95} showed photographs of a man, aged 25, whose nose had been broken a few years ago. He had come to have the deformity, the ordinary "saddle-back nose," relieved, and Stimson had inserted a canoe-shaped piece of aluminium five-eighths of an inch long between the skin and bones, through a small incision on the ala, thus raising the bridge of the nose to its proper line. The piece of metal healed in very nicely, but, as the outline of the nose, viewed from in front, was not exactly straight, the man returned after a year in order to have this slight defect remedied. Therefore Stimson removed the piece of aluminium and inserted in its stead one of gutta-percha, about half as large again. The incision through which it was intro-

duced at the ala was closed by a suture and healed by primary union. The outline of the nose was now slightly aquiline. A few other cases have been treated in a similar manner during the last year, and the cosmetic results have been more satisfactory than those obtained by any other method.

E. M. Foote¹_{Sept. 28, '95} reported from the service of W. T. Bull at the New York Hospital a case of traumatic deformity of the nose restored after eighteen years by means of a platinum bridge. The upper lip and nose were separated from the superior maxilla sufficiently to expose the nasal bones. Holes were drilled into the left nasal bone and into both superior maxillary bones just outside the anterior nares. Into these three holes were pressed the three supports of the platinum bridge and the nose drawn into position over it. A steel pin, passed through the nose from side to side, held it accurately in position. The operation was followed by considerable swelling of the face and headache. These symptoms had entirely disappeared in a week. The steel pin was removed on the seventh day. The patient left the hospital in seventeen days without any signs of irritation.

Cheiloplasty.

A new method of autoplasty of the lower lip was proposed by A. Guinard, of Paris,¹¹²⁶_{Oct. 15, '95} who stated that Larger had, in 1894, described to the Paris Surgical Society an operation of cheiloplasty immediately after ablation of an epithelioma occupying two-thirds of the lower lip. To remedy the loss of substance he proceeded as follows: 1. An incision was made from the union of the left third with the right two-thirds of the upper lip, directed toward the ala of the nose, and including the entire thickness of the lip, the *cut-de-sac*, and the buccal mucous membrane. 2. A second incision was made from the upper extremity of the first incision downward from the naso-labial fold to a point on the cheek a little below and to the left of the left labial commissure. The flap being turned down, it is sutured by its three edges to the lips of the quadrangular breach, after the lower edge of the flap has been freshened; this border being formed by the mucous membrane of the upper lip, the membrane is destroyed in order to permit of the edge being sutured to the horizontal branch of the loss of substance. The upper lip is then sutured vertically to the cheek. The procedure described by Guinard is derived from Larger's, differing from it in three points: (1) the operation is double and symmetrical, instead of unilateral, being thus accompanied by marked facial symmetry; (2) the mucous membrane forming the free edge of the upper lid, instead of being destroyed, is dissected,

turned over, and sutured in a groove in front of the maxillary in such a way as to reconstitute the buccal vestibule; (3) the mucous membrane of the deep surface of the lip is sutured to the skin by eversion in order to form a new mucous border. The advantages of this operation are numerous. A considerable loss of substance can be remedied, while the new lip is entirely formed of normal tissue of the lip and lined with mucous membrane, so that it can retain saliva and take up food. The consecutive deformity is, of necessity, considerable, but it is rather a change of physiognomy than a deformity, as the face is symmetrical and the cicatrices but slight.

Gallaudet, of New York, ⁹⁶_{Aug., '95} removed an epithelioma of the entire lower lip by Regnier's method. ²²⁶_{V., 41, P. 3, '91} Abbe, in the discussion, said that a method such as Regnier's, consisting in working flaps in from the side, gave a very good result except that the mouth was a little pinched; he had also tried another by bringing the parts up from below and sides,—a German method which had given him the best results. A point which had impressed him was the manner in which the mucous membrane would spread from the gums out over the granulating surface, so that in the end one had a red lip with vermilion border.

McBurney did not think that the method of Regnier compared with that of Malgaigne. The latter had some very superior points. One was that the lip was entirely covered with mucous membrane from the time the operation was finished. Another was that the lower lip was left entirely free from the teeth; so that one could place his finger between the teeth and the lip. In other words, the lip was a very natural one. It was not uncommon for the healing to be quite complete within from ten to twelve days. All the cases did well. Malgaigne's operation could, moreover, be applied with perfect success to cases in which the disease extended from the mucous membrane downward nearly to the point of the chin. Even in such cases a complete mucous membrane could be supplied to the new lip.

Gallaudet stated that one of the advantages of Regnier's operation was its simplicity. It was so simple that anybody could do it, and that was one reason why he had desired to bring it to the attention of the society, in order that through its transactions it might become known to less experienced operators than the gentlemen present. Malgaigne's operation required skill and experience.

P. Berger ²⁰⁹⁰_{'94; Mar., '95} presented an article on methods of cheiloplasty in cases in which extensive loss of substance has occurred. Almost total destruction of the lower lip as a result of burns, lupus, or syphilitic ulceration is the most common, and occurs in one of the following forms:—

(a) The mucosa remains; the skin only is destroyed. In this case the mucosa is turned outward, and its free border is attached more or less low down upon the chin by cicatricial contraction; a true cicatricial exstrophy of the lower lip exists. These conditions are most favorable of any for autoplasty; the Italian method is especially applicable to such cases. The free border of mucosa is divided and dissected up till it is quite free from attachments to fibres of the orbicularis muscle. In the same manner the cicatrices of the chin are made free as far as the subhyoid region. The entire anterior aspect of the chin and lower lip is then covered in by a large flap from the arm, which is left attached to the arm and secured to the chin by sutures until it unites. At the end of from eight to twelve days the pedicle is divided and the flap is neatly trimmed and approximated to its new position.

(b) The mucosa has been partially destroyed at the same time that the skin was, but a part of the free border of the lip remains, and is attached to the cicatrix. In this case use the following technique: Find and release whatever remains of the free border of the lip, following the margin carefully and loosening the mucosa so that the buccal orifice is inclosed by mucosa, even though it be a trifle small. Then release the portion of the scar which is adherent to the jaw and form a flap whose base is continuous with the alveolar border; loosen this flap with its cicatricial surface toward the buccal cavity in such a manner that it will form the inner surface of the lower lip. The bridge of mucosa, which was first constructed, is now sutured to this new flap so that it forms the free border of the lip. A flap from the arm now is used, as in the first case, to close in the raw surface of the lip; or in some cases, where the space is not large, a sliding flap from the subhyoid region will answer fully as well.

(c) It may also happen that all of the parts which make up the lip have been destroyed; there remains neither skin, muscles, mucosa, nor free border. The entire lip must be reconstructed. In such cases the new skin and mucosa must be obtained from the cheek and carefully joined to the edge where the loss of tissue ceases. A sliding flap one or two finger-breadths wide is made in the cheek, or, if necessary, one from each cheek, which are joined on the median line. The opening in the cheek is closed by suturing the opposite sides together.

Congenital Fissure of Lips and Palate.

The treatment of congenital fissures of the lips and palatine vault was considered by A. Broca, ¹²⁶_{Jan. 15, '96} who has operated on 60 cases of harelip and 24 of cleft palate. Of the former the oper-

ation was followed by death only in young infants admitted to hospital without their mothers. In these cases the mortality is high, from broncho-pneumonia and infantile diarrhœa. All those accompanied by their mother or wet-nurse recovered, with primary union.

The anatomical varieties of cleft palate among the 24 cases treated were as follow: 3 divisions of the soft palate alone; 6 divisions of the soft palate and part of the hard palate; 7 divisions of the soft palate and the entire hard palate; 8 divisions of the soft palate, hard palate, and alveolar border,—4 unilateral and 4 bilateral. In the first three classes the only complete failure was in a child $3\frac{1}{2}$ years old. In total unilateral cleft there was one failure,—in a case in which the flap was torn in detaching it. Two cases of total bilateral cleft with harelip were successful, and good results were obtained in two cases of total cleft with bilateral harelip,—a variety often considered inoperable.

Case ⁶¹ ⁸⁰ presented an extremely instructive paper on the surgical treatment of congenital cleft palate. He shows that a permanent closure of the fissure by uniting the tissue along the border of the cleft is not successful unless there is provided thereby a palate which, in conjunction with the pharyngeal muscles, will enable the patient to forcibly expel all the air which is the vehicle of the voice through the mouth, and often through a narrowed opening, with intensified force,—as in speaking the words hiss, hug, etc., and in those vocal interruptions which can only be perfectly produced by a complete closure of every avenue of escape of an accumulated pressure of air, with the production of a sudden vocal explosion at the lips or between the tongue and different locations along the roof of the mouth or palate, as in pronouncing the letters *b*, *t*, *k*, etc.

The principal object of the patient in submitting to operation is for the purpose of perfecting or benefiting articulate speech. With a surgical method of treating cleft palate when performed later than infancy or very early childhood, this result is attained only in most exceptional cases. The promise of improvement is certainly so slight that the most skillful surgeon is not warranted in operating on patients older than 20, or even 10 where the cleft extends partially through the hard palate and with the tissues of the soft palate comparatively scant from non-use during the age of its growth and development.

Surgical treatment for congenital cleft palate should be undertaken as soon after birth as safety to life will warrant. After 5 years of age, be the cleft great or small, the operation should be performed only in those rare instances which promise an un-

questionable result in the desired length and mobility of the united velum palati.

The artificial method of treating congenital cleft palate for patients under 18 or 15 years of age can be relied upon, when skillfully performed, as furnishing a sure means by which may be attained perfect vocal articulation, free from the undesirable nasal tone which is characteristic of this deformity. Though the same success cannot always be promised at a more advanced age, a decided improvement invariably results where the artificial palate can be developed according to the needs and possibilities of the muscles and where the patients are persistent in their vocal exercises. It is, unfortunately, true that a surgical operation, even though it perfectly and completely unites the hard and soft palates without providing for sufficient length of the velum, makes the subsequent application of an artificial palate more difficult and less satisfactory.

Alex²¹¹_{Jan. 20, '95} presented to the Lyons Medical Society a metallic splint made by Martin to facilitate the operation for harelip. The apparatus is made after a plaster model of the maxillary of a normal child, and was constructed of aluminium sufficiently malleable to be adapted to the maxillary after the intermaxillary bone has been brought down. It is kept in place by the two ends of the metallic wire of the bone suture, reunited in front of the anterior edge of the groove. The apparatus has the double advantage of preventing the child from moving the intermaxillary fragment with its tongue, and of preventing the detached lip from reuniting with the gum, as so often happens after operation for harelip. The child shown to the society by Alex had worn the apparatus for three weeks, and was in no way inconvenienced by it, being able to eat easily even solid foods.

Malformations of the Lips and Palate—Harelip.

Etiology and Pathology.—Weismann, of Herisan,²¹⁴_{Sept. 1, '95} publishes the following interesting instance of hereditary harelip. He was recently invited to operate upon a child with harelip of medium-degree. An inquiry elicited the fact that the child's father had been born with a medium scar on the upper lip, the latter's two brothers both had harelips and cleft palates, and their father presented the same malformations.

König⁴_{Aug. 26, '95; Dec. 1}⁸¹⁴ studied the etiological connection between amniotic adhesions and bands and harelip. These abnormalities may produce the cleft in various ways. There may be an adhesion between the foetus and the amnion directly at the spot where the parts of the lip should unite. There may be an adhesion on the cheek,

which acts by traction and prevents the inward growth of that part of the upper lip. There may finally be an adhesion between some distant portion of the embryo and the amnion, and the band passing between these two points may be drawn so tightly across the face that the upper jaw on that side cannot develop. These suppositions are borne out by remains in the shape of cutaneous appendages or other marks of amniotic adhesions or bands, such as deformities or "amputations" of extremities.

Treatment.—Heath, of London, ¹⁵ ⁸⁰ Aug., '95; Sept. 16 in a lecture on this subject, states that the best time for operating, in the absence of some special indication, is about the sixth week. The operation which he advises is to pare one side of the lip freely and to cut a flap from the other side of the lip and transfer it to the opposite side. It is usually most convenient to take the flap from the longer side. The author prefers fine, dry, chromicized catgut sutures, applied closely. By means of one of the sutures, which is left long, the lip is inverted and two or three stitches introduced to bring the mucous membrane together. A piece of adhesive plaster is used to draw the cheeks together to relieve the sutures from tension. As it is desirable to avoid crying, the writer directs that the child be nursed assiduously and that minute doses of opium be given at intervals. During the process of healing it is recommended to feed the child with a spoon.

Kraske, ⁷⁶¹ _{B. 14, H. 2} in a case in which the cleft was so extensive that the usual operations seemed to promise little, made use of the hypertrophied inferior turbinated bones with gratifying success. He found the structure of the turbinates to be well adapted to plastic work. The technique which he recommends is the following: With bent scissors the turbinate bone is separated from in front backward until a pedicle remains measuring about one-third inch. If the posterior limit of the bone cannot be seen it can be readily determined by means of a sound. Even with this small pedicle there is no danger of death of the flap, since its chief nutrient supply comes through the posterior nasal artery, which is not wounded in the separation; neither are the principal branches of distribution damaged, as they run parallel to the free margin of the turbinate and close to it. Hæmorrhage is easily stilled by tamponing. The flap thus formed may be twisted and stitched to the anterior portion of the cleft, or it may be bent backward and stitched to the margin posteriorly, or one turbinate may be used anteriorly and one posteriorly. In less severe cases, or if the turbinates are greatly hypertrophied, one may suffice. In the latter case the turbinate should be chosen upon whose side the nasal passage is more occluded. After ten to fourteen days union is

sufficiently firm to permit of the section of the pedicle and its suture to the cleft margin. For its division the author recommends the cold-wire snare.

Félizet ¹⁶⁴_{Nov. 8, '94} calls attention to a new method of staphylorrhaphy which prevents the separation of sutures. He invariably noted that complete sections of the soft palate, through its entire thickness, healed with the greatest facility in children, and he conceived the idea of utilizing this fact in staphylorrhaphy by making liberating incisions through the entire thickness of the soft palate, including the nasal mucous membrane. This incision he made on each side by transfixion, which was facilitated by seizing the soft palate with a special forceps. Three cases thus operated on recovered without difficulty.

Le Dentu, ¹⁰_{Apr. 12, '95} in a paper on osteotomy of the superior maxillary, with section of the nasal septum, for uranostaphylorrhaphy, relates three cases of harelip with alveolar and palatine fissure. He believes that in these complicated cases the operation is made easier and restoration more perfect by preliminary osteotomy of palatine vault and nasal septum. Connection of the edges of the fissure is facilitated by those large liberations.

D'Arcy Power, of London, ²_{Nov. 24, '94} reported a case of recurrent and severe hæmorrhage after the operation for cleft palate, the child having got its hand into its mouth and picked at the silver sutures. The bleeding was unusual, on account of its severity and from its occurrence so long after the operation. It came undoubtedly from one of the larger branches of the posterior or descending palatine artery. These branches are very irregularly distributed. In this instance one of the branches presumably ran along the edge of the cleft and was included in one of the horse-hair sutures.

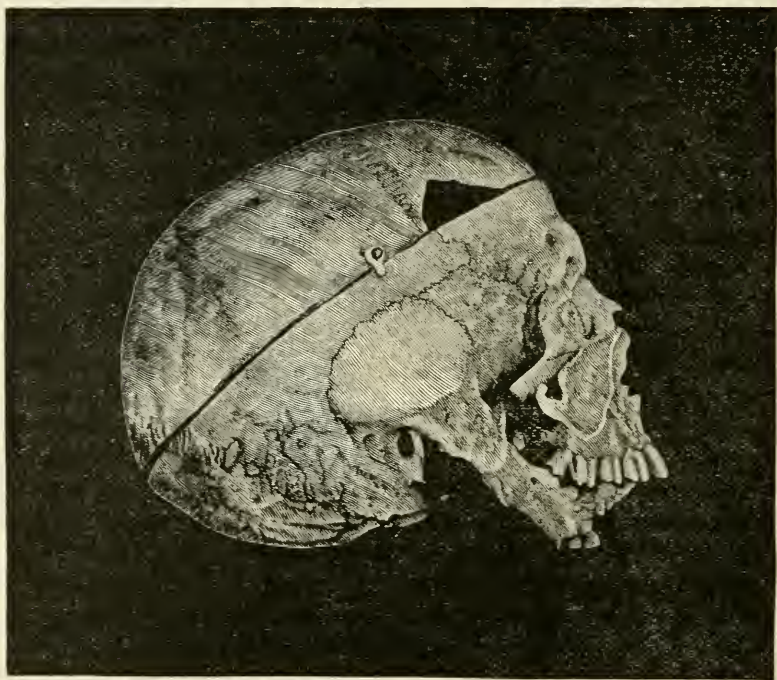
[It is generally very difficult to prevent children from disturbing the dressing and reaching the wound with their hands. H. Littlewood, of Leeds, fixes both elbows in the extended position with a few turns of plaster-of-Paris bandage, and thus makes it impossible for the child to reach its mouth.]

DISEASES OF THE JAWS.

Ankylosis.

Pathology.—The pathological transformations occurring in some cases of osseous ankylosis of both temporo-maxillary articulations are well shown in the skull of a male subject found by David M. Greig ³⁶_{Oct., '94} in the dissecting-room of Dundee University College. On dividing the zygoma vertically and the temporo-

maxillary articulations from before backward and throwing the detached portion forward, the component parts of the joint were found to be absolutely fused, the cancellous tissue of the jaw being directly continuous with that of the temporal bone. The skull, set on a plane surface, rested behind on the inferior curved lines of the occiput and in front on the left side of the body of the jaw. In the cut shown herewith the detached portion of the right articulation is turned forward and the small, twisted, coronoid process is well shown.



ANKYLOSIS OF MAXILLARY ARTICULATION. COMPLETE FUSION OF THE COMPONENT PARTS OF THE JOINT. (GREIG.)

Edinburgh Medical Journal.

The etiology of the condition here presented was most probably suppurative parotitis. This had been followed or accompanied with arthritis, the articular cartilages on the right side having been absorbed, and subsequent osteitis had caused fusion of the bones. On the left side the arthritis had been rather periarticular than interarticular. The immobility thus produced had led to degeneration of the muscles acting on these parts, this being more extreme on the right side, where the whole process had been more severe. Along with the atrophy of the soft parts the lower jaw had undergone alteration, having become smaller, and the angles

had disappeared just as we find in extreme old age. In eating, the man must have crushed his solid food with his fingers and packed it inside his lips, the food being then drawn into the buccal cavity by suction or forced therein by the buccinator muscles, which were specially well developed. Operation in this case would obviously have been futile, unless, indeed, the condyle, neck, and part of the ascending ramus on the right side had been removed early in the course of the disease, in which case some movement might have been retained in the left articulation.

Borelius³⁷⁰_{Oct., '94; Feb. 2, '95} reports the case of a boy, aged 10, who had scarlet fever with diphtheria at 2 years of age, and double otorrhœa. Shortly afterward it was noticed that he could not open his mouth properly, and a year later the jaw was completely fixed. The condition had been the same ever since. On inspection a peculiar, bird-like condition of the face was noticed, due to the apparent absence of chin. This was found to be caused by the extreme smallness and atrophy of the inferior jaw, and not to any faulty position of that bone. On separating the lips the molar teeth of both jaws were firmly fixed together. The lower incisors were slanting backward and the upper ones forward, leaving a space of about two centimetres between them; through this space the child was able to feed himself.

Ferreri⁵⁰⁵_{p. 149, '96} stated that ankylosis of the jaw was rare after lesions of the ear, but might follow tuberculous arthritis in patients suffering from suppuration of the ear. He reported three such cases.

Treatment.—Osteotomy of the ascending branch of the maxillary, with muscular interposition, in unilateral temporo-maxillary ankylosis was considered by Rochet, of Lyons, ³_{Oct. 17, '94} who stated that osteotomy was often followed by return of the ankylosis through union of the osteotomized surfaces, in spite of all precautions taken to bring about pseudarthrosis. He attempted to assure the latter condition by muscular interposition. In the case of a young man affected with severe unilateral temporo-maxillary ankylosis he performed cuneiform osteotomy in the median part of the ascending branch, and interposed between the osseous surface a muscular layer, one and one-half centimetres wide, from the masseter, obtained by cutting from below upward, suturing it to the internal pterygoid. The result at the time of report, five months later, was excellent, the lower jaw being capable of energetic movements and the mouth opening from three and one-half to four centimetres. The condition was improving daily and pseudarthrosis seemed assured.

Lentz, of Metz, ¹⁰⁸_{Dec. 1, '96} successfully applied Helferich's method

of condyloid resection. In this procedure, after having tied the internal maxillary artery to prevent secondary hæmorrhage, a muscular flap from the temporal is interposed after resection of the condyle and fixed either to the maxillary or to the parotideo-masseteric fascia. Rochet, of France, cuts the ascending branch and interposes the masseter. Arbuthnot Lane, of London, ²_{Oct. 19, '96} treated four cases by excision. He considered that the occasional failure of this operation resulted from an insufficiently free removal of bone.

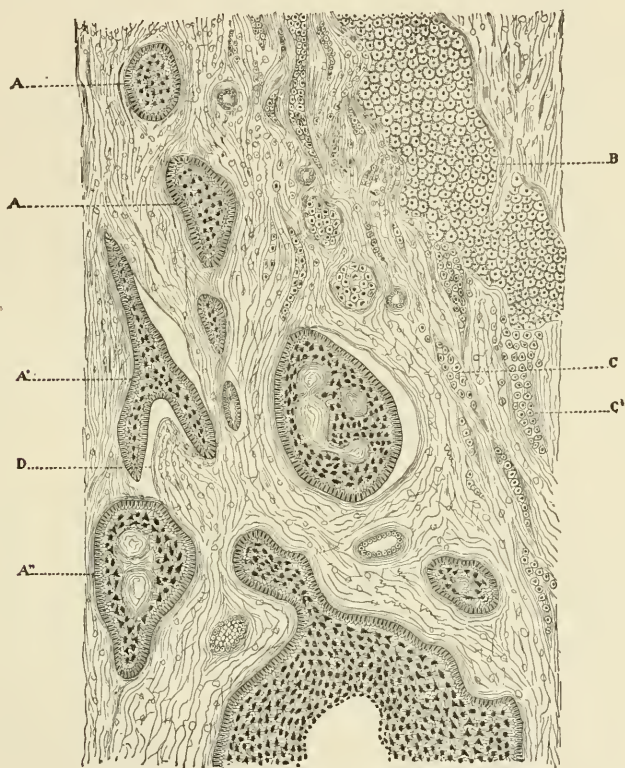
E. N. Nason, ²_{Jan. 12, '95} reports a case of twelve years' standing in which a wedge (with the base posteriorly) was removed from the ascending ramus just above the angle. Movement was commenced on the third day and gave very little pain. The patient had now, after a year's interval, excellent masticatory powers. Whitehead, of Manchester, ²_{Dec. 15, '94} operated in the same manner in a case in which the deformity was attributed to an arthritis following some fever in early childhood. From his experience passive movements were more easily persevered in by the patients after this operation than when the condyles were excised. Cabot, of Boston, ⁹⁹_{July 17, '96} also performed this operation for unilateral bony ankylosis of the jaw, the result of otitis following scarlet fever, the wedge-shaped piece being resected out of the neck of the maxilla through an incision just beneath the zygoma. The boy could, at the time of the report, three years after the operation, open his mouth one and three-fourths inches, the jaw having lateral, grinding motion of three-fourths of an inch. The scar is almost invisible and there is no paralysis of the facial nerves.

Elliot, of Boston, ⁹⁹_{July 4, '95} performed an osteoplastic operation for ankylosis of the jaw in a boy of 12 years, who had had complete ankylosis of the jaw since he was 10 months old. He was emaciated and his jaw was small and undeveloped. One year ago the ramus was divided on both sides. The jaw was constantly moved, and, finally, good motion was established. The patient can eat well and has gained in weight.

Tumors.

Mixed Adamantine Growths.—Tapie, of Toulouse, ¹⁰⁸⁸_{July 15, '96} published an anatomo-pathological study of a case of cystic adamantine and Malpighian epithelioma of the inferior maxillary and its transformation into carcinoma. The pathology of these tumors has been considered by Malassez, ⁴¹⁰_{'95} Derujunsky, ⁸_{'90} Audry, ⁹²⁷_{'88} and Chibret, ²⁰⁰⁰_{'94} whose observations demonstrated the close relationship existing between these almost solid, or but slightly cystic, neoplasms and those almost exclusively formed of cysts. Between

the two extremes intermediate or transitional forms exist. The characteristic feature is proliferation of epithelium into the thickness of the growth or into the cavities. By this new theory, all solid, partly cystic, or wholly cystic tumors inside the maxillaries are members of the same epithelial family. Everything in their constitution is subordinate to epithelial activity. The variability in the proportion of the different elements and in the morphology



EPITHELIO-ADAMANTINE TUMOR. (TAPIÉ.)

A A, adamantine type of epithelium; A', adamantine organ pushed back on the connective papilla, D; A'', adamantine epithelium with epidermic globes; B, Malpighian mucous-membrane type of epithelium; C C', streaks of epithelioid cells.

Archives Médicales de Toulouse.

of the cellular elements in published descriptions can readily be guessed. All these cases present interesting peculiarities and new distinguishing features; but, in all this apparent complexity, analysis shows the key to the dissimilarity to be the varying activity of the epithelium. (See cut.)

Chibret²⁰⁰⁰₉₄ made a contribution to the anato-mo-pathological study of adamantine epitheliomata. These growths present more or less marked phases of differentiation. In certain cases the tumor

consists only of epithelial streaks of polyhedric cells, the adamantine type appearing only in the swollen extremities of the streaks. In a second class the differentiation is greater, the epithelial masses being formed of cylindrical peripheral cells and indifferent central cells or star-shaped ones. In a third class the adamantine organ appears with its three orders of cells, peripheral cylindrical, flattened or intermediate stratum cells, and central star-shaped or pulp cells. These masses give rise to cysts forming a covering for the peripheral cylindrical cells.

Sarcoma.—E. D. Martin, of New Orleans, ¹²_{Sept., '95} reported a case of resection of inferior maxilla for osteosarcoma treated with immediate prothesis by artificial maxilla imbedded in tissues. From this case he concludes that when the disease has been extensive an artificial apparatus cannot be permanent, as necrosis at the point of fixation is apt to follow, a suppurating sinus being the result. In all cases in which the operation is extensive, especially when it involves the symphysis, a temporary splint should be inserted to hold the glossal muscles *in situ* until union has taken place and a firm cicatrix formed. The splint should be made of large wire or silver tubing, so as to be easily removed through an incision at one or both ends. This measure will reduce the deformity to a minimum.

[A general conclusion that an artificial apparatus cannot be permanent after resection of the inferior maxilla is hardly warranted when based upon a single case. Diathetic conditions, age, and the inherent physical resistance of a given patient are as many conditions likely to bear a marked influence upon the results, to say nothing of the material utilized in constructing the apparatus. Verneuil, Claude Martin, and others have vividly demonstrated that prothetic apparatuses are well borne in many properly selected cases and when the material selected for the manufacture of the apparatus is suitable. Nevertheless, the present case, as well as many others in which skillful attempts at permanent prothesis have failed, should moderate the ardor of enthusiasts in this attractive, but exceedingly difficult, field of surgery.]

J. I. Darby, of Americus, Ga., ¹¹⁷_{Sept., '94} cured a case of osteosarcoma of the left inferior maxillary by means of hypodermatic injections of pyoktanin, 10 drops of a 1 to 500 solution being used daily, gradually increasing the quantity after the first week until half an ordinary syringe-ful was injected at a time. This was kept up for one month, when the injections were made every second day for two months longer, the sarcoma having then entirely disappeared.

Epithelioma.—Frank Wister Thomas, of Germantown, ⁹_{Nov. 2, '95}

reported a case of epithelioma of the upper jaw. The particular points of interest in this case are the association of a distinctly gouty history with the occurrence of the affection, the strange absence of lancinating pain, the slight tendency to glandular enlargement, the delay in the appearance of cachexia, and the great similarity of the physical appearance and progress of the disease to the ulcerative or open form of epithelioma of the jaw, as described by Bond.

Osteitis.

E. Vincent, of Algiers, ¹⁰⁴³_{Aug., '95} called attention to an early sign of certain forms of osteitis of the inferior maxillary terminating in necrosis. He reported three such cases of acute osteitis following difficult eruption of a wisdom-tooth, in two of which cases the inferior dental nerve was destroyed, the sign of its destruction being anæsthesia of its terminal branches. The author stated, however, that though such anæsthesia was a certain indication that the bones took part in the pathological process, its absence did not as certainly signify the contrary, though it did show that the bone was only superficially attacked and that necrosis had not involved the centre of the maxillary body.

DISEASES OF THE MOUTH.

Cancer of the Tongue.

• **Diagnosis.**—The differential diagnosis between syphilis of the tongue and cancer is sometimes difficult. Two pieces of the tongue removed by Hutchinson ²²_{June 19, '95} from a patient displayed the “white-paint” condition often seen in hard smokers in whom there is a syphilitic taint. These patches of sclerosis thus described were always suspicious from the point of view of cancer. In the present case, on careful examination before the operation, the diseased part was seen to be minutely papillated, the small papillary overgrowth giving a resemblance to cauliflower-buds flattened out. The base of the patch was distinctly hard. There was no ulceration; nevertheless, the signs were so typical of the early stage of cancer that the patient was advised to submit to the removal of the disease. On section the main piece removed showed distinctly the naked-eye appearances of cancer.

Warrington Haward, of London, ⁶_{Mar. 2, '96} in reporting a case of epithelioma of the tongue in a woman, states that, although epithelioma of the tongue rarely attacks females, occasional cases such as the above remind us that they are not quite exempt from

it and that it does sometimes occur in them. According to A. E. Barker, the proportion is 247 males to 46 females. This is probably above the average for true cancers. From the statistical reports of St. Thomas's Hospital for the years 1881-1893, inclusive, we learn that there were 160 cases of epithelioma of the tongue under treatment, of which number only 16 patients were women. Haward expresses the opinion that, when epithelioma affects the tongue in women, a larger proportion of the cases will be found to be under the age of 30 than obtains in the other sex.

Anderson ⁸²⁴_{Jan., '95} ⁵_{Aug.} called attention to the fact that precancerous conditions, which at the outset may appear benign, have grafted upon them a cancerous condition; therefore, no surgical lesion of the tongue, unless it be of a merely transitory nature, must be regarded as unimportant. In every sore of doubtful character a portion of the diseased tissue should be excised and examined under the microscope. The piece should not be a mere fragment snipped off with the scissors; such an investigation could only mislead. Cocaine should be injected and a substantial piece of tissue, including the substance of the sore and a little margin, should be removed. The sections for examination should be cut at right angles to the surface of the sore.

Treatment.—Edward Cotterell ⁶_{Nov. 3, '94} ¹⁴⁷_{Feb., '95} states that it may be taken as an established fact that, to prevent early recurrence of cancer, it is best to remove thoroughly the lymphatic glands next to the disease. Even where the glands are not apparently enlarged he makes a practice of cleaning out each submaxillary space and ligaturing the lingual arteries before removing the tongue. *He has frequently found the glands diseased, although no enlargement was detected before the operation. The space is opened by making an incision similar to that employed in ligaturing the lingual artery underneath the hyoglossus, but extending a little farther backward. The facial artery is tied just before it enters the submaxillary gland and when it emerges from it. The submaxillary glands themselves are removed, along with the lymphatics, which does away with the dribbling of saliva, so distressing to the patient, and insures the thorough cleaning away of all the lymphatics. Where the floor of the mouth is extensively involved he recommends Kocher's operation.

[In such operations the heat of the mouth tends to promote the development of infectious elements and fermentation, causing fœtor. Puzey, ⁶_{Apr. 6, '95} in two cases, was able to thoroughly prevent the latter by hourly painting the whole wound with glycerin and borax. Scrupulous cleanliness of the oral cavity need hardly be insisted upon.]

Abbe, of New York, ⁵⁹_{Nov. 17, '94} performed Kocher's operation for removal of the whole tongue, the patient regaining remarkable power of speech since the operation, four months before report. He had no difficulty in making himself understood in a large room and was able to utter all the sounds of the alphabet except k, which he pronounced p,—saying, for instance, “pip” for “kick.” The general health had again become perfect. There was a slight recurrence which it would be necessary to remove.

George Buchanan, of Glasgow, ³⁶_{Mar. '95} reports as still living a case operated on thirty years ago in which excision of one lateral half of the tongue for cancer was performed. The operation is not advised unless the disease is limited to one side of the anterior half of the tongue and has not yet invaded the loose mucous tissue in the floor of the mouth.

Miscellaneous Tumors of the Tongue.

Sarcoma.—A case of large, round-celled sarcoma of the tongue was observed by E. K. Dunham, of New York. ⁵_{Sept. '96} When examined under a low power of the microscope the epithelial covering of the tongue could be traced over the whole surface of the tumor. In most places it was normal and rested upon fibrous tissue, beneath which, in many places, there were a few striated muscle-fibres. In other places the neoplasm approached the surface and was covered by only a thin layer of fibrous tissue and a layer of stretched epithelium four or five cells deep. The subepithelial connective tissue was, here and there, the seat of a moderate round-celled infiltration. In no place was there any sign of its invasion by epithelium from the surface. Beneath these coverings was the neoplasm, which was not sharply defined from the overlying fibrous tissue, as prolongations from the latter penetrated the substance of the new growth and became continuous with its fibrous elements. The mass of the neoplasm was traversed by delicate processes of fibrous tissue, barely sufficient in most places to furnish support to capillary blood-vessels. These processes, by their disposition, gave the sections an irregular, reticular appearance. Between these fibrous processes were cells with an abundant protoplasm and from one to four distinctly vesicular nuclei. The majority of these cells were round, but a few spindle-shaped and some irregular cells were also present, the latter owing their shape apparently to compression. The round cells ranged in size from 9μ to 30μ in diameter, and a few, which were vacuolated, measured 45μ in diameter. Here and there among these cells were a few leucocytes with dense, nearly homogeneous nuclei.

Papilloma.—Cornil ¹¹⁵³_{July 24, '96} showed to the Paris Anatomical

Society a tumor of the tongue removed by Péan. It consisted of hard, cone-shaped villousities and small, nipple-like excrescences, the tongue thus resembling the skin of a porcupine. Histological examination showed the tumor to be a corneous papilloma. Numerous papillæ could be seen in the sections, more or less divided, formed of vessels and connective tissue, and upon which were implanted heaped-up cells of stratified pavement-epithelium. Here and there were scattered some pearly bodies.

Fibromyxoma.—McWeeny showed to the Royal Academy of Medicine in Ireland an encapsuled, translucent, yellow tumor about the size of the kernel of a hazel-nut, removed by Chance at the Mater Misericordiæ Hospital. ¹⁶_{Nov., '95} A swelling had been noticed for some time on the dorsum of the tongue, to the left of the middle line and about an inch from the tip. The tumor came away at once, being quite free from adhesion to the surrounding structures. Histologically examined after fixation in Foà's reagent, it proved to be a fibroma, with here and there so much structureless or faintly fibrillated ground-substance as to justify the name myxoma. In the middle were several lacunar spaces filled with red blood-corpuscles and coagulated albuminous material. They were evidently dilated lymph-spaces into which hæmorrhage had taken place. In the neighborhood of other places where there had been small hæmorrhages numerous cells laden with golden pigment, as well as extra-cellular pigment-granules, were seen. Most of the nuclei in this growth were spindle-shaped, some being very wavy in outline, but here and there were patches of epithelioid cells with vesicular nuclei. Mitoses were not seen. The rarity of fibromyxoma occurring in the tongue was alluded to.

Adenoma.—Cresswell Baber, of London, ¹¹_{Feb., '95} reported a case of adenoma of the tongue in a girl, aged 16, who presented a history of difficulty in swallowing and thickness of speech for nine months. A tumor was found at the base of the tongue, about the size of a small walnut, which hid the larynx from view. There was no dyspnœa. The growth closely resembled thyroid tissue, and might well be connected with some fœtal remains of the lingual duct. There were no cysts, nor did the tumor present any tubular structure. This case, therefore, seemed to support the theory advocated by Bernays and Bland Sutton,—that these tumors are of the nature of accessory thyroid glands.

Ankyloglossia (Tongue-tie).

An interesting case of rapid speech development in an adult, following operation for tongue-tie, was described by G. Hudson Makuen, of Philadelphia. ¹⁹_{Mar. 30, '95} The patient was 19 years of age,

a farmer by occupation, and up to within eleven months had been utterly unable to use articulate speech in a manner which could be understood. Makuen found that he could protrude the tip of the tongue scarcely beyond the outer margin of the lips. The frænum did not appear to be a very decided factor in holding it down or back, for in his attempts to protrude the tongue the frænum was not greatly stretched. The trouble seemed to be a muscular one. The author clipped the frænum of the tongue well back and ordered several hours' vocal drill each day for several months, during which time he made considerable improvement in sounds and words which did not require free action of the tip of the tongue. By this time Makuen was convinced that the trouble was entirely a local one, and decided to divide the anterior fibres of the geniohyoglossus muscle, and thus try to give to the tongue the necessary freedom of action. With cocaine anæsthesia he made an incision under the tongue of three-quarters of an inch in the antero-posterior direction and one and one-half inches from side to side. There was considerable bleeding, which was easily controlled. After an inflammatory period of some seriousness he practiced frequent lingual traction and vocal exercises directed toward a free action of the tongue. His improvement from this time was rapid, and in a year he spoke perfectly.

Cutting the frænum of the tongue was discussed by Chervin, who stated ⁹⁹⁶_{Sept. 10, '94; Oct. 13} that sections of the frænum should be extremely limited in its application; when, for example, there exists an ankyloglossia, congenital or acquired, immobilizing the tongue more or less in a part of the mouth. This may be total or partial. When the frænum is excessively long, reaching sometimes to the point of the tongue and impeding its movements, simple section is not sufficient; excision must be resorted to. This operation should not be employed commonly, for, insignificant in itself, it sometimes offers serious dangers on account of the child's age. It is wrong, according to Chervin, to think it is always indispensable if the child nurse badly. A few exercises in suction on the finger may correct this defect without any operative intervention. In all cases excision of the frænum is absolutely useless for correcting faults of pronunciation. They are amenable only to a methodical, natural, and rational education of the organs of speech, the duration of which need not exceed three weeks.

Salivary Calculus.

In discussing the origin of salivary calculus, H. B. Burchard, of Philadelphia, ⁸⁰⁵_{Oct., '95} stated that the hypothesis as at present formulated is that salivary calculi are due to the action of lactic acid

upon the secretions of the salivary glands and the glands of the oral mucous membrane; that by the union of these two substances a coagulum of mucin is formed, in which are deposited and entangled precipitated lime-salts, mainly lacto-phosphate; that the deposits are similar to calculi in other parts; but whether the union of the colloid with the lime-salts is more definite than a mixture is undetermined.

Sheild, of London, ²_{Mar. 2, '95} described the case of a man, aged 35 years, who complained of a hard lump in the floor of the mouth and a small tumor in the neck, painful after eating. Over the tumor in the mouth there was an excrescence which simulated cancer. With a needle the author discovered the calculus, which was further demonstrated by the patient spitting a piece out. The rest was removed *secundum artem*. Wm. Robertson ¹¹_{June, '95} met with a similar condition in a bushman while in practice in South Africa. The stone was the size of a bantam's egg in this case. An interesting case of salivary calculus was also reported by J. G. Harvey, of Decatur, Ill. ³⁶⁴_{Dec. 16, '95}

TUMORS.

BY THE CENTRAL EDITORIAL STAFF.

SUBMITTED FOR COMMENTATION TO
ERNEST LAPLACE, M.D., LL.D.,
ASSOCIATE EDITOR,
PHILADELPHIA.

General Considerations.

Carl Löwenthal, of Munich, ²²⁶ ⁹⁶ _{B. 49, H. 1, 2; July, '95} has collected reports of 800 tumors showing a traumatic origin; 750 had already been published and 50 new cases are added. A short history of each case is given and numerous tables and analyses are made. The kinds and locations of the tumors may be seen in the following table:—

KIND OF TUMOR.	Number of Individuals.	Head.	Face.	Neck.	Breast.	Back.	Abdomen.	Urinary Organs.	Genital Organs.	Pelvis and Lumbal Region.	Upper Extremity.	Lower Extremity.	Multiple Tumors.
Carcinoma . . .	358	16	103	1	152	2	8	15	17	..	18	26	
Adenoma . . .	10				9		1						
Fibroma . . .	21	3	2	1	3	2	2				4	4	
Lipoma . . .	16	5	1	1		1					6	2	
Myxoma . . .	8	3					1		1			3	
Chondroma . . .	27				4				2		9	10	
Osteoma . . .	18	1	2							1	3	11	
Angioma . . .	5		2								2	1	
Myoma . . .	2							1	1				
Glioma . . .	11	11											
Neuroma . . .	8										6	2	
Sarcoma . . .	316	54	24	9	30	7	8	4	21	12	42	103	2
Total	800	93	134	12	198	12	20	20	42	15	90	162	2

While carcinomata are more often produced by chronic irritation than by sudden injury, still, cases of the latter class are by no means rare. Among 934 cases of carcinoma of the breast reported by various authors, 125, or 13.4 per cent., gave a history of traumatic origin. After excluding all doubtful cases the well-

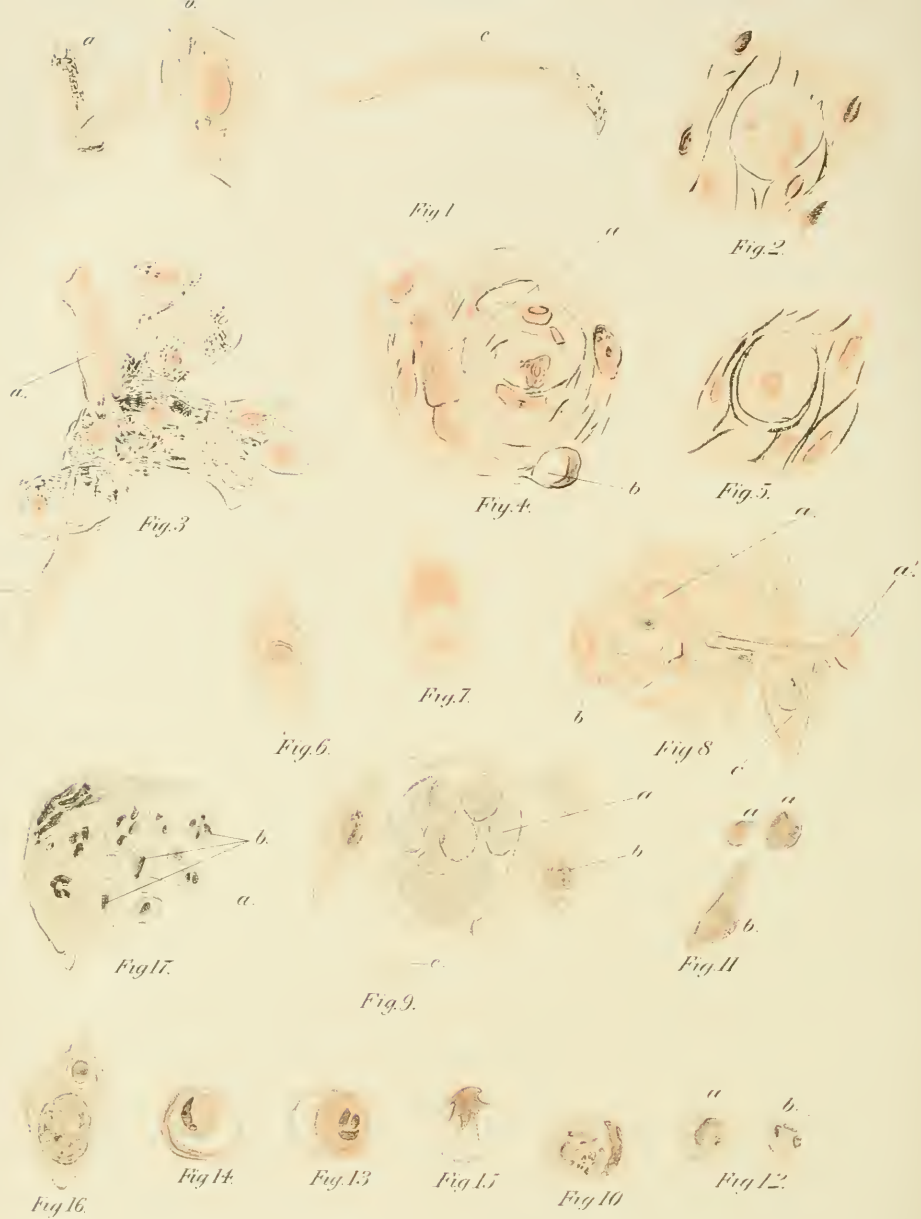
authenticated cases showing traumatic origin may be divided into two classes: those in which a wound does not heal, but takes on cancerous ulceration, or after healing the scar forms a cancer, and those in which a cancer develops at the exact site of an injury which left no wound. Of the 316 cases of sarcoma reported, 216 were in the male, 97 in the female; the difference in the two sexes is due to the fact that the male is more exposed to injury. The length of time between the injury and the appearance of the tumor varies from a few days to forty-nine years. In a number of cases old scars have developed into sarcomata many years after the original injury. Among 190 cases 135 developed within a month after the injury, 33 inside of a year, and 22 after a year.

From this great quantity of material the author thinks there can be no doubt that a trauma can give rise to a tumor, malignant or otherwise, either by stimulating misplaced embryonal tissue to more active growth, according to the theory of Cohnheim, or by so changing the nutrition of normal tissue that it takes on a pathological growth. B. B. Davis, of Omaha, ¹⁰⁶_{Sept., '95} concludes an elaborate paper by the statement that in traumatism and irritation we have a definite cause of all new growths.

Féré ⁹¹_{Aug., '95} ⁸¹⁴_{Nov. 1} discusses certain facts which appear to bear on the heredity of a tendency to the formation of new growths. He mentions several cases in which there was a remarkable coincidence of numerous neoplasms and of various signs of poor development, or "degeneracy," usually associated with nervous conditions of various kinds. He mentions one example—a male 38 years of age, epileptic, cranio-facial hemiatrophy, lack of development of ulnar fingers on left side, webbed toes on the right foot, three lipomata in the left axilla—whose brother presents the same asymmetry of the face and a tumor in the left parotid, and who states that the males of his family frequently have tumors on the left side; he also has four lipomata on the left side of the chest, left inguinal hernia, and webbed toes on the left foot. Féré considers that not merely the frequency of the coincidence of degenerative signs with tumors, but the fact that the latter are more numerous on that part of the body which most shows the lack of development, compels one to admit that tumors are more likely to occur in such undeveloped parts, if not themselves directly the result of some fault of development.

Cancer.

Pathogenesis.—The etiology of cancer, with especial regard to protozoan parasites, was considered by Allen J. Smith, of Galveston, ¹_{Jan. 5, '95} who stated that two points stand out in bold relief from



Etiology of Cancer (Allen J. Smith)

New York Medical Journal

a study of the subject. These are: 1. That cancer presents a course and clinical aspect analogous to those of formations of parasitic origin. 2. That within cancerous tissues occur bodies which closely resemble the different life-stages of protozoa, of sporozoa, and of gregarinidæ. The accompanying colored plate gives the results of his examinations of twelve growths:—

Explanation of Plate.—Fig. 1. *a*, gregarine form of parasite; *b*, epithelial cell; *c*, gregarine form with apparent flagellum. From epithelioma of penis, stained with borax-carminé. Half-inch hom. oil-immersion lens, oc. 4, Zeiss.

Fig. 2. Hyaline body lying among epithelial cells in a space—stained slightly deeper than cells, possibly the resting form of the gregarine. Same specimen and same amplification as above.

Fig. 3. Gregarine form of parasite among a group of epithelial cells; *a*, apparently anterior, and, *b*, apparently posterior end. It could not, however, be told surely if *a* and *b* are continuous, the cells and granular matter obscuring the supposed central portion of the body.

Fig. 4. Concentric nest from epithelioma of lip, stained with safranin: *a*, gregarine form, apparently in conjugation; *b*, vacuolated cells.

Fig. 5. Same as Fig. 3.

Figs. 6 and 7. Epithelial cells from secondary epithelioma of inguinal gland; stain, safranin. Fig. 6, showing small intra-nuclear body (?); Fig. 7, showing rounded hyaline body in vacuole of cell.

Fig. 8. Group of cells from epithelioma of lip; stain, safranin: *a*, rhizopod-like body, apparently giving origin by gemmation to a new body, *a'*; *b*, possibly a second similar body; *c*, epithelium.

Fig. 9. Sporocyst lying between epithelial cells in a cancer of testicle; stained with hæmatoxylin and faintly counter-stained with eosin: *a*, deeply stained, probably relatively-young spore-bodies; *a*, epithelium; *b*, red blood-cells introduced for comparison of size and hue with spore-bodies.

Fig. 10. Same specimen. Intra-cellular body with deeply-staining interior masses (possibly pseudonavicellæ).

Fig. 11. From an epithelioma of breast, stained with hæmatoxylin and lightly counter-stained with eosin: *a*, spore-bodies lying free in spaces (probably after escaping from spore-cyst); *b*, gregarine form.

Fig. 12. Same specimen. Cells containing possible pseudonavicellæ.

Figs 13 and 14. Same specimen. Spore-like bodies apparently within remnants of epithelial cells and containing pseudonavicella-like masses.

Fig. 15. Appearance simulating Korotneff's amœba form; apparently due to vacuolation and destruction or contraction of protoplasm of an epithelial cell.

Fig. 16. Epithelial cell containing two small spore-like bodies in a vacuole.

Fig. 17. Ruptured sporocyst, showing escape of spore-bodies which are apparently older than in Fig. 9, as shown by their fainter hue and by their containing numerous pseudonavicella-like bodies.

James Braithwaite, of London, ^{June 29, '96} had noticed the rapid spread of a very superficial epithelioma on the vulvar mucous membrane and also of a small rodent ulcer on the cheek. In both cases the mode of growth was by invasion of apparently healthy epithelium at the margin of the disease. Associating this observation with the discovery made by Haviland, that cancer exists endemically in populations living upon low-lying moist soils and in certain "cancer-houses," the conclusion seemed highly probable that the disease is caused by a micro-organism, a fungus, and not, as supposed, a bacterium, coccidium, or protozoön. In a large Jewish population in Leeds not one Jewess has been found to have cancer of the genital organs, whereas the disease is ex-

tremely common among the Christian women. This observation led to an examination of the secretion frequently contained within the prepuce. Spores and mycelium were found, and this fungus was identical in appearance with one since found in epithelioma taken from the ear, the uterus, the breast, the lip, and the penis, and which could be demonstrated without any difficulty.

[An editorial writer ⁶ June 29, '95 considers the fungi which Braithwaite has found as probably belonging to the class of hyphomycetes. The spores of such fungi abound in atmospheric dust, and the readiness with which they germinate is notorious. Although Braithwaite asserts that he has found their mycelial threads penetrating the substance of neoplasms (recent and preserved) there is room for skepticism when it is remembered that mold-fungi are not infrequently found mingling with tissues on the microscopical slide. Apart from any fallacy of this kind, however, it is well to recall that similar fungi have been found in the body—*e.g.*, in the lungs—and have been introduced into it experimentally, with the result that they have either been quite innocuous or have merely excited some local inflammation.—E. L.]

Kahane, of Vienna, ³ Mar. 20, '95 obtained a yeast-fungus—a species of *saccharomyces*—from cultures of a cancer of the uterus. He also found it several times in cancerous and sarcomatous tumors. Its pathogenic nature had previously been demonstrated by Busse and Sanfelice, who showed that it gave rise to suppuration and the formation of areas in the abdominal viscera. Sanfelice ⁵⁰ May 21, '95 regards the pathologico-anatomical alterations produced by this fungus as of less importance than its complete morphological correspondence with the various bodies described by different authors as *coccidia* peculiar to the malignant tumors of man. On inoculation into guinea-pigs and other animals it produces a chronic infection with tumor-formation in the lymph-glands and the abdominal and thoracic viscera. From a study of sections made from the new growths the author believes he is justified in concluding that, by inoculation of a pure culture of yeast into the mammary gland of a bitch, cellular new formations were originated which, by the arrangement of their elements, remind one of the structure of carcinoma; further, that, in consequence of the occurrence of new growths at the point of inoculation, metastases were formed in the intestine, kidneys, and spleen. Herz, of Vienna, ³ Mar. 20, '95 from the fact that the fungus appears to prevent the development of bacteria, concluded that its presence in a tissue should not always be regarded as unfavorable. Maffucci and Sirleo ⁹²¹ June 1, '95 also gave the results of experiments with a form of blastomycetes. Injected into the rabbit, guinea-pig, chicken, and dog it gave rise to non-

inflammatory new formations resembling epithelial or endothelial growths. The authors never succeeded in obtaining pure cultures from malignant epithelial growths in man. They therefore withhold their opinion as to the exact relation between the blastomycetes and cancer.

[S. G. Shattock and C. A. Ballance²⁰⁰⁵_{No. 352} have shown that carcinomatous and sarcomatous tumors from the human subject cannot be transplanted in the lower animals.—E. L.]

Richet, of Paris,¹⁴_{June 5, '95} in a study of the toxic effects of intravenous injections of the pulp of epithelial cancer, obtained varying results, according to the nature of the tumor from which the pulp was taken. Non-ulcerous sarcomata or carcinomata did not appear to be toxic, 10 grammes ($2\frac{1}{2}$ drachms) of sarcomatous tissue per kilogramme ($2\frac{1}{5}$ pounds) of body-weight being injected into animals without causing any reaction. On the other hand, ulcerated mucous-membrane epithelioma proved extremely poisonous, several grammes of epitheliomatous vegetations from the uterus causing convulsions and death in half a minute in a dog weighing 22 kilogrammes (48 pounds); 2 cubic centimetres ($\frac{1}{2}$ drachm) of the fluid obtained by crushing 7 grammes ($1\frac{3}{4}$ drachms) of an epithelioma of the lip killed a large rabbit in a few seconds; 0.7 gramme (11 minims) of the fluid extracted from 15 grammes ($\frac{1}{2}$ ounce) of an epithelioma of the cervix killed a rabbit and caused convulsions and arrest of respiration in a small dog, the heart being enormously accelerated and the general condition remaining serious for the space of an hour. The dose of 0.7 gramme (11 minims) represented hardly more than $\frac{5}{1000}$ of the tumor. The poison of mucous-membrane epithelioma did not seem to be destroyed by heat, even after heating in the autoclave. This fluid killed rabbits in doses of 0.02 gramme ($\frac{1}{5}$ minim) per kilogramme ($2\frac{1}{5}$ pounds) of body-weight.

Eifer¹²⁰⁰_{Nov. 15, '95} stated that, whether cancer be attributable to a fungus, a bacillus, or a protozoön, the reaction of the affected tissue is in all cases different from that met with in pathological conditions generally. He compared them with the excrescences of vegetable pathology,—for instance, the gall-nuts caused by hymenoptera or the parasitic disease, hernia of cabbage, recently studied,²⁰⁰⁴_{Aug. '95} in which a fungus of a lower order, the plasmodiophora brassicæ, leads to swelling and death of the roots. The latter, then, under the influence of the bacillus amylobacter and other bacteria, becomes a veritable centre of infection, causing the cacodyle which gives out the well-known bad odor. This process recalls the complications of suppurating cancer in man, in which hectic fever is due to the bacilli of the pus.

Maurice Cazin ¹²⁰¹_{Oct. 20, '95} emits the following judgment on the psorospermic theory of cancer: Like the microbial theory which preceded it, with the researches of Rapin, Secuerlen, Schill, Domingos Freire, Koubassoff, and others, the psorospermic theory of cancer is not based upon any striking facts and seems to have now lost ground, while the non-parasitic theory, as advanced by Brault, presents arguments of great value. Taking into account the fact that anatomo-pathological study of parasitic diseases has not yet shown that parasites are capable of causing other than inflammatory reactions in the tissues, it may be said, in a general way, that the parasitic hypothesis of epithelial cancer has no certain facts to support it. Without, however, claiming that cancer *cannot* be of parasitic origin, seeing that there is no absolute knowledge on this point, Cazin contents himself with concluding, like Fabre-Domergue, that what has been described in recent years as parasites of cancer are in reality cellular degenerations, and that, as far as the etiology is concerned, we are, as in the past, totally in ignorance, the question being one for solution in the future.

Herbert Snow ²_{Sept. 22, '94} points out that every variety of malignant new growth exhibits from its earliest initiation the phenomenon of an extremely copious leucocytic immigration, and that the leucocytes steadily and progressively increase in number throughout, but are always restricted to the normal tissues, generally fibrous, immediately bordering on the cancerous parenchyma. Penetration, even of the cell-masses, is exceptional, and it is doubtful whether the few leucocytes found among the cancer-cells in sections from tumors at an advanced stage are not merely the result of displacement in preparation for the microscope. In any case the great majority remain outside the parenchyma, as may be readily seen in any such thin section, and the leucocytes seen upon or among the cancer-cells are extremely scanty. The author argues that in cancer the leucocytes do not check, but, on the contrary, aid the progress of the infiltration by macerating the inhibiting barriers of fibrous tissue.

Carl Heitzmann, of New York, ²²_{June 12, '95} read a paper before the Vienna Medical Club in which he stated that he had long ago demonstrated the reticular structure of the blood-corpuscle found in the cancerous cell. If the red blood-corpuscle be treated with chromate of potassium, vacuoles will be observed in the internal structure. The corpuscle will still possess amœboid movement. After the course of an hour a distinct structure will be observed in these spaces with fine filaments passing over them, and among these threads the hæmoglobin will be found collected. This prod-

uct has been looked upon by some as an artificial production, but close observation has convinced many that this is not the case. If a drop of blood be placed under an object-glass hermetically sealed, the serum will be found to become yellow in a short time. The hæmoglobin is gradually washed out, when the fine threads can be easily brought to view lying in a retiform manner across the field. This reticular structure is also to be met with in the blood-corpuscle found in the acid urine, which tends to confirm the opinion that this retiform cell is endowed with movement as the other protoplasmic cell, as the net-work possesses the same material.

The hæmatoblast of Hayem, which was supposed to carry the syphilitic poison, when treated with acetic acid, revealed a similar structure. In the white blood-corpuscles a similar contractile structure exists in the white substance. According to Heitzmann, this net-work of the corpuscle is an excellent indicator of the vitality of the body.

Chudovsky, of Budapest, ³¹_{Mar. 6, '96} made 111 examinations of the blood in 51 patients suffering from tumors, and found that in patients with malignant growths not treated there was always a diminution of hæmoglobin, the quantity increasing after extirpation of the tumor, and in some instances even reaching the normal. On the other hand, there was considerable oscillation in the variability of form and numbers of the leucocytes; for instance, in 26 cases of cancer the author found an increase of the polynuclear leucocytes 14 times, an increase of lymphocytes 11 times, a normal relation 3 times, and an increase of both forms twice. In 9 cases of sarcoma there was always an increase of the polynuclear form. In 14 out of 16 cases of benign tumors the composition of the blood was normal. The author believes that examination of the blood after extirpation of the tumor may be of value in the prognosis.

Mayet, of Lyons, ³_{Aug. 21, '95} found by experiment phenomena favoring the hypothesis of a humoral alteration in cancer. If a preparation of serum obtained by vesication is heated to $+38^{\circ}$ C. (100.4° F.) by means of platinum, numerous leucocytes possessed of marked amœboid movements will be observed. If a similar preparation be made by mixing the same serum with an equal quantity of the juice extracted from a cancer, the amœboid movements will be found to be at least twice as extensive and rapid as in the first preparation.

The assertions of Rommelaere, of Brussels, that hypoazoturia and hypophosphaturia were a constant condition in cancerous patients, and therefore of value in the diagnosis, led Duplay,

Cazin, and Savoie ⁶⁷³_{Aug., '95} to a series of investigations in 15 cases of cancer of various organs, leading them to results entirely contrary to those of Rommelaere. They found that the amount of urea diminished only when the patients could no longer take sufficient nourishment; hypoazoturia cannot, therefore, be considered as a symptom of cancer, but simply one of the manifestations that may lead to cancerous cachexia when the patients can no longer take food. If a change of regimen assuring sufficient nourishment can be given, it will cause an elimination of urea not greatly differing from that of normal subjects. The same is true of phosphaturia, which is not as constant in the disease as has been claimed.

Ribbert, of Zurich, ²⁰_{July 2, '95} ⁹⁹_{Oct. 17} contributes some further observations in support of his theory that the origin of carcinoma is due to a primary new growth of connective tissue which encroaches upon the epithelium of a part and separates portions of it from their normal relations, so that a growth of masses of epithelial cells arises under abnormal conditions. Tillmanns, of Leipzig, ³³⁶_{July 6, '95} accepts the theory of Waldeyer and Ribbert that carcinoma arises from any subepithelial proliferation by which the epithelial cells are isolated and made to grow abnormally. Experiments in support of the alleged zymotic origin of cancers have hitherto been without success, the bacilli found in the growth not being capable of producing real carcinoma in other persons.

Roger Williams, of Manchester, ²_{Dec. 21, '95} also considers the essential feature of malignancy of carcinoma to be a persistence of undue proliferative activity. The process by which cancers and other neoplasms arise might be regarded as a kind of abnormal generation. Hence the genesis of cancer and other neoplasms is a phenomenon of the same order as discontinuous growth in general.

Contagiousness.—Several years ago, T. Law Webb, of Ironbridge, reported six cases of cancer occurring in two dwellings under one roof, and also mentioned another series of three cases treated in one cottage. He now reports ³²_{Oct., '94} a sequence of cancer cases from the same neighborhood. Among the examples cited may be mentioned the following: An accountant died from cancer of the breast in 1869. His housekeeper died in the same house from cancer of the stomach in 1885, while in 1894 the gentleman who succeeded to the duties of the deceased accountant succumbed to cancer of the tongue complicated with disease of the lungs. He occupied the same rooms as his predecessor. The water used for drinking purposes is supposed to be responsible for so many cases occurring in one district.

In two houses under one roof, with a drain-system and a water-supply common to both, six people died of cancer in twenty-six years. In house No. 1 a man 28 years of age died of cancer of the rectum. The house was then occupied by a man and his wife. The man died of cancer of the stomach about two years after the death of the first tenant, and ten years later his widow died of cancer of the rectum. In No. 2, at about the same time, a woman died of cancer of the breast. No. 1 was occupied later by three maiden ladies. Of these one died four years ago of cancer of the uterus, a second died last winter with all the symptoms of cancer of the stomach, and the third still survives. In a group of twenty cottages nine cases of cancer occurred in fifteen years. All of the inhabitants used water from a certain pump by the roadside, close to a filthy hovel. One cottage furnished three of the nine cases. None of the nine people were of kin, and in no instance was there a family history of a malignant disease.

A. Haviland, ²⁶_{June 1, '95} while investigating the catchment basin of the river Wey, in the Farnham district of the Thames basin, found one of these "cancer-houses," situated about twenty feet above the stream, in a damp, sodden soil. A man aged 68, who had contracted an epithelioma of the lip while living in this house, said that his grandmother died of cancer there, then her son, and thirdly her grandson, all of whom had been operated on. He was then taken with the disease and moved from his native hollow to one on the opposite side of the ridge, where he died last summer. Haviland believes that soil and situation have much to do with the mortality from cancer, and his well-known collection of statistics in England and Wales shows that "cancer is most prevalent along the courses of rivers which seasonally flood their banks, and especially where, from the flatness of the country, the floods are retained."

T. Law Webb, of Ironbridge, ³²_{Oct., '95} states that he has practiced for twenty-five years in a district overlying the Shropshire coal-field, and during that time he has been surgeon to two collieries, yet he has never seen a single case of cancerous disease in a collier who was working in the pits. The explanation lies partly, Webb thinks, in the habitual cleanliness of the collier, who "tubs" daily as soon as he comes home from the pits, and partly from the fact that his habits very rarely lead him to drink water from casual sources.

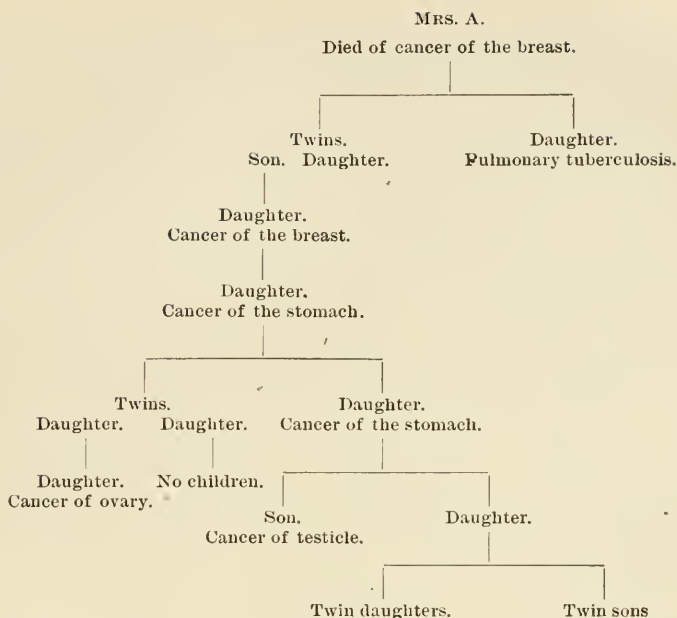
W. R. Williams, of Preston, ²_{Oct. 28, '95} also thinks that it may be affirmed that colliers are relatively less liable to cancer than almost any other class of the community. There are few districts where cancer is less prevalent than in the great colliery centres of Derby-

shire, South Wales, Durham, and Lancashire. In London and its vicinity, where the wealth of the nation is clotted, the cancer mortality is highest, and it is a significant fact that the mortality is highest of all in those parts of the metropolis where the well-to-do most abound.

Henri Morau ²⁰⁸_{Jan. 12, '95} adds some new facts to those already published demonstrating the contagiousness of cancer. He inoculated a series of white mice with cylindrical epithelioma obtained from mice of the same species, and was able to determine the active rôle played by bedbugs in the inoculation of cancer. He placed a series of healthy white mice in pairs in new cages, isolated and resting in a receptacle containing essence of turpentine and camphor. Some of these animals were left thus, while others were given as companions a large number of bedbugs taken from infected cages. Some months later he found that all the animals in the cages containing bedbugs had become cancerous, while the animals in the other cages had remained healthy. In the course of his experiments Morau frequently substituted the bedbug for the Pravaz syringe as a means of inoculation.

Heredity.—The congenital and hereditary origin of cancer is considered by Critzman, of Paris, ¹⁴_{Nov. 17, '94} who states that all acquired lesions modify the general physiology of nutrition, and that this modification must act upon the nutrition of the germinative cells. Now, the function of the nucleus is to transmit a characteristic, and the function of the protoplasm is the development and nutrition of the cell. If, then, the acquired lesion does not influence the nucleus (absence of heredity), it certainly exercises a vicious influence on the protoplasm of the genital cell. The nucleus is badly nourished, the cells originating by division suffer from this morbid condition of the protoplasm, and the individual either does not develop, as in the repeated abortions due to syphilis, or comes into the world puny and badly prepared to fight against the infectious agents which assail him. These considerations justify Critzman in believing that cancerous subjects give birth to cancerous children. While tuberculous subjects have children born with a predisposition to contract tuberculous disease, which may be counteracted by modern hygienic measures, the individual who is born with cancer in his system is beyond the aid of human intervention.

The essential heredity of cancer accords also with the coincidence or, rather, the alternation between twin pregnancies and cancer,—a coincidence which he has personally observed on several occasions. He gives the following genealogical tree as proving this point:—



These cases prove, in the author's opinion, that cancer is hereditary; that this heredity is essential, and not purely a predisposition; that there may be a remarkable alternation between cancer and twin pregnancy; that the twins, though belonging to a cancerous family, are not affected by the disease. The author believes that in order for an individual to fall a victim to the disease he must bear within his economy the epithelial neoformation cell and must be in a state of morbid receptivity,—a condition realized by senile involution, so favorable to the development of cancerous tumors.

J. S. Prettyman, of Milford, Del., ⁵⁹Nov. 9, '96 became satisfied years ago that a predisposition to cancer exists in every case, and this predisposition, or remote cause, he has found to be slow mercurial poisoning. He has carefully searched out the history of many cases and has never yet failed to discover that such persons had been subjected to a process of slow poisoning from the use or abuse of this poison.

In regard to the relation of cancer and tubercle the conclusions of W. Roger Williams, of Preston, ⁶Dec. 22, '94 are, briefly, as follow: 1. Pulmonary tubercle is by far the most prevalent disease among the relatives of cancerous persons. Such persons are very much more prone to it than the rest of the community; indeed, their liability is so considerable as even to equal that of the phthisical themselves. 2. A large proportion of cancer patients

are the surviving members of tuberculous families. 3. No heritable condition is more favorable to the development of cancer than that which predisposes to and accompanies tubercle. 4. Nevertheless, between tuberculous and cancerous manifestations there is a certain antagonism, for it is very rare to find both diseases in active progress in the same individual. 5. As a rule, where tuberculous diseases are most prevalent, there cancer is rarest. 6. The great increase of cancer during the last half-century has coincided with a remarkable decline in the death-rate from tuberculous diseases, especially phthisis. It seems to him exceedingly probable, from considerations derived from the study of the family history of cancer patients, that a large proportion of those thus saved from tubercle eventually perish from cancer and insanity, and he thinks that the increase in the latter disease has largely been brought about in this way. He regards the predisposition to cancer as closely allied to the tuberculous predisposition, of which, in all probability, it is but a diluted form.

Sarcoma.

Pathogeny.—In a paper on sarcomata and lymphomata of syphilitic origin, von Esmarch, of Kiel, ³³⁶_{July 6, '96} remarked that certain cases of sarcoma were due to syphilis and could be cured by specific treatment. He has had a personal experience of about forty such cases. The tumor may be in relation either with an hereditary or an acquired syphilis. A second point of importance is the seat of the tumor; for instance, tumors of the striated muscles are often syphilitic, as are those of the skull, abdominal wall, and tibia. Rapid recurrence after extirpation also argues in favor of a syphilitic origin. In a patient operated on for sarcoma of the thigh, rapid recurrence compelled the author to perform disarticulation of the hip. Recurrence again took place in the stump, but the administration of iodide of potassium caused complete disappearance of the growth. Tumors which yield to arsenical treatment may also be considered as probably of syphilitic origin, as well as those which disappear after erysipelas or the injection of toxins. Microscopical examination is of great importance in making a diagnosis, and, when the tumor is seen under the microscope to be formed of granulations with areas of fatty degeneration and proliferation of the vessel-walls, the case is necessarily one of syphiloma.

G. Ricker ²²⁶_{B.3} reported two cases showing the relation between lymphosarcoma and tuberculosis, and demonstrating once more that the bacillus of tuberculosis may, under certain as yet little understood conditions, provoke the development of tumors of great

malignancy and cause rapid death by metastasis in the internal organs. Additional researches are required to show the rôle of the Koch bacillus in the development of malignant lymphomata and lymphosarcomata. To all appearances this rôle is considerable, as it is known that lymphosarcomata often contain caseous areas. On the other hand, it is certain that these growths are not always due to this bacillus, the absence of caseous areas being a proof. It is, therefore, probable that other micro-organisms are capable of producing tumors of this kind. The author endeavors to explain the transformation of relatively benign tuberculous lymphomata into malign growths of rapid evolution by an increased virulence of the pathogenic bacillus under certain conditions as yet unknown.

Quénu, of Paris, ³_{Dec. 25, '95} in a paper on the nature of sarcomata and their place in the classification of tumors, stated that formerly it would have been regarded as a great error to establish any relation between encephaloid sarcomata and fibromata; to-day it is admitted as a classical fact that they belong to the same family. We now see between these growths, apparently more widely separated than are round-cell sarcomata from giant-cell tumors, only a difference in evolution, not in nature. Clinical experience itself demonstrates that these growths, of fibrous aspect, stationary for from fifteen to twenty years, all at once undergo a development toward the embryonal type and become generalized. This was formerly called the transformation of tumors. It remains none the less true that fibroids, adult connective-tissue tumors, are benign growths, curable by extirpation or even spontaneously curable. Quénu questions whether there may not exist between the various giant-cell tumors analogous differences, as real, if not as striking. This opinion has been expressed by Heurtaux ³⁶⁰_{Jan., Feb., '91} in his interesting study of myeloma of the tendinous sheaths,—a subject also taken up by Longuet and Landel. ³⁶⁰_{Nov., '95} The tumors characterized by these histologists as myelomata are marked by three distinguishing points: (1) the predominance of multinuclear or giant-cells; (2) the existence of adult connective tissue in the centre of the tumor; (3) the perfect organization or the sclerosis of the walls of the vessels in the tumor. There would thus be embryonal giant-cell tumors and adult giant-cell tumors, or myelomata, the latter manifesting their adult type by the absence of lacunæ and embryonal capillaries and the presence, on the contrary, of vessels with sclerous walls. Quénu adds to the findings of Heurtaux, Longuet, and Landel the fact that the adult type is manifested also by granular fatty degeneration of the cells as well as by the production of fibrous tissue in the centre of the tumor. Double fibro-caseous evolution is not peculiar alone to tuberculosis or syphilis;

it is the possible termination, though in varying degrees, of all connective-tissue reaction following common inflammations of known origin, as well as following neoplasms the origin of which is unknown. In any case it would not be sufficient to exclude a neoplasia from classification as a tumor.

In a paper on the non-existence of "round-celled" sarcoma as a distinct class of growths, Herbert Snow, of London, ^{Nov. 9, '95} states that at the present day the word "sarcoma" is frequently used in a similarly vague sense, and in particular "round-celled sarcoma" may denote almost any rapidly-growing mass of round or oval cells whose origin is very often doubtful. The lesions thus designated fall into three groups, and are either (*a*) carcinomata, (*b*) lymphocarcinomata, or (*c*) blastomata. Of the first the huge encephaloid cancers of the female breast are the type. There is only slight concurrent enlargement of the axillary glands. Examined at the core, they consist of a loose mass of cells and cell *débris*, with little acinar structure. A thin section, however, from the growing margin will display the familiar acini of mammary carcinoma. True sarcoma is rather rare in the breast, except in association with cysts. The second group, lymphocarcinoma, springs from adenoid tissue in some form or other, to which appertains the bone-marrow. As well as in the more external lymph-glands, the growth may develop in those of the abdominal cavity and mediastina, in the tonsils, spleen, omentum, etc.; this variety also comprises the central tumors of bone. The third, blastoma, springs from uneffaced embryonic vestiges; it may very largely consist of round-celled parenchyma, but this is most commonly mingled with other structures—tubules, cysts, acini, etc.; its favored sites are the kidney, ovary, and other derivatives of the Wolffian body. After careful study for many years past of all the specimens which presented themselves, the author has been forced to the conclusion that no tumor solely composed of round cells originates in the connective tissues; that every sarcoma properly so called contains abundant spindle-celled tissue, or spindle-cells ranged in bands, and that none can be held genuine without this pathognomonic sign.

In the discussion Bowlby stated that he could not for a moment allow that the only form of true sarcoma was spindle-celled, and he denied that connective tissue was always present in round-celled sarcomata. That melanotic carcinoma at times arose in the skin was proved, but this did not show that none of the melanotic tumors arising in this situation were sarcomata.

The pathogeny and treatment of sarcomata formed the subject of a paper by Pierre Delbet, of Paris, ¹¹⁵³ _{July 13, '95} who expressed the

opinion that the classification of sarcomata is only a trial grouping, and that it will some day be abolished. In fact, the beginning has come already, since actinomycotic tumors were for a long time considered as sarcomata.

Delbet, in examining under a strong lens the juice or fragments of freshly-extirpated sarcomata, observed the presence of small bodies, highly refractive and extremely mobile. They might have been micrococci, but their refraction made him suspect that they might be fat. He therefore treated them by alcohol and ether, but they remained resistant. He could not emphasize their importance, as he is not yet convinced that they were not fat. He concludes that the pathogeny of sarcoma is as yet obscure. There is no rigorously certain scientific proof of its infectious origin, even less than for lymphosarcoma, but he is convinced that such proof will eventually be complete. There are, as he demonstrates, spreading and recurrent tumors, clinically like sarcomata, which are due to tuberculosis or syphilis. It may therefore be said that there are tuberculous and syphilitic sarcomata, as there are tuberculous lymphadenomata. As to other sarcomata which are neither tuberculous nor lymphatic, it is extremely probable that they also have an infectious origin,—that is, that they are due to microbes. Delbet does not believe that there is a specific pathogenic agent, but that probably several microbes are capable of producing sarcomatous growths, and that in this variety of pathogenic agents will be found the explanation of the different evolutions of the neoplasms in different cases.

Clarke⁵⁰_{B.16, No. 20} found free, intra-cellular, and spore-bearing forms of sporozoa in numerous cases of sarcoma, and Vedeler⁵⁰_{B.16, No. 21} shows drawings of living sporozoa found in sarcomata, morphologically quite different from those in the various forms of carcinoma.

O. Hildebrand, of Göttingen,²⁰_{B.149, H. 2, '95} has observed amylaceous bodies in a case of endosteal sarcoma of the sternum. Jürgens⁴_{No. 1, '95} was able to inoculate animals with sarcoma melanoticum carcinomatodes, the material for inoculation having been taken from the body of a patient dead thirty-six hours. This would indicate that the dead tissue contained bodies capable of reproduction in the animal organism, and that these bodies produced the same lesions as in man without septic infection.

Treatment of Malignant Tumors.

Serum Treatment.—Since the publication of his last paper (see 1894 ANNUAL, vol. iii., L-13), Coley, of New York,⁵⁹_{May 18, '95} made an important modification in the method of using the erysipelas toxins, which consists in first subjecting animals to the action of

the toxins for a time and then employing the blood-serum of these animals instead of the toxins. This does away with the severe reactions and depressing effects that follow the injection of the toxins. The next question to be determined by further experiment was the relative value of the serum and the toxins. In the fall of 1894, Buxton, in conjunction with Emil Schmitt, began to immunize a horse to erysipelas, giving constantly increasing doses of virulent cultures of erysipelas, sterilized cultures, and bacillus prodigiosus prepared in the same way as described by Coley when used for sarcoma. After the horse had been injected for six weeks, and was able to withstand very large doses with little effect, he was bled, and the serum was placed in small, glass-stoppered bottles and kept in the dark. This serum Coley employed upon 11 cases,—2 very large and advanced cases of inoperable carcinoma, a case of large malignant tumor of the neck, with secondary involvement of the sternum (probably carcinoma), and 1 of recurrent carcinoma of the breast.

[Since the beginning of the year Coley's method was tried in almost every civilized country, but it is reasonable to suppose that nowhere was it carried out with the same care, the same attention to details, as by the author himself. This may account for the varying results reported. At any rate condemnation should be postponed until thoroughly warranted. The reports given below are arranged chronologically and include only those furnishing clear data.—E. L.]

Friedrich, of Leipzig, ⁹⁶_{Jan., '96} gives thirteen cases of epithelial carcinoma and four cases of sarcoma. Although in the cases of carcinoma there were many signs of improvement, there was no cure in the anatomical sense. The improvement in one of the cases of sarcoma lasted a long time and encouraged the continuance of the experiments in other cases of the same kind.

Herman Mynter, of Buffalo, ⁵⁹_{Feb. 9, '96} reports a case of sarcoma (verified histologically) of the abdominal cavity in a patient 12 years old. After three months' treatment the patient was discharged with a fistula, which was granulating; hardly any discharge, and no swelling in the pelvis, but some infiltration in the anterior abdominal wall. The size of the abdomen was reduced to normal.

Dewitt, of St. Paul, ¹⁰⁵_{No. 9, '95} reports four cases of malignant disease treated by Coley's method,—three carcinomata and one sarcoma. Two of these were very far advanced recurrent carcinomata of the uterus and were not affected by the treatment. In the case of sarcoma the tumor was in the abdominal wall, measured eight by nine inches, and had recurred twice. The patient received the

toxins of erysipelas, and in two weeks the size of the tumor had remarkably diminished, measuring then only five by six inches. It remained stationary for four weeks, then began to increase in size, and was finally removed. It was a round-celled sarcoma. Small doses of the erysipelas toxins, with bacillus prodigiosus, were continued, and there has been no sign of recurrence. The other case was one of carcinoma of the cervix, which was removed and the patient treated with injections of the toxins. The operative wound healed completely and was apparently normal at the time of the report. Dewitt's conclusions are that, in very advanced, inoperable cases, especially of cancer, this treatment would seem to be useless.

At the meeting of the American Medical Association in May, 1895, Nicholas Senn, of Chicago, ⁹⁹_{May 23, '95} read a paper stating that the erysipelas toxins had failed in all his cases, and that actual attacks of erysipelas and injections must differ in the effects produced; because in one instance, by limiting it to the superficial lymphatics, in certain cases these pathways must be obliterated, and in exceptional cases, by obstructing these pathways, a limitation of the extension or a complete cure of the disease might be possible. In a number of cases where cures have been claimed, the diagnosis has not been verified by clinical or microscopical examinations.

His toxins were derived from three different sources. In nine cases he had used from twenty-five to seventy-five injections of from 3 to 15 minims. He not only failed to obtain a cure, but in some instances the injections appeared to aggravate the local and general condition of the patient. The cases in which this treatment had been resorted to were all inoperable, and, as nothing else could be done for this class of cases, he would continue his experiments.

W. B. Coley stated that he had treated 84 cases during the past four years. They were all malignant: 43 sarcomata and 27 carcinomata. Eleven sarcomata and 2 carcinomata were cured. Three of the cures were of two years' standing. Sayre, of New York, had seen some of Coley's cases before treatment and again one year after treatment. In no single instance was there any evidence of a return of the disease.

Fenger, of Chicago, stated at the same meeting that he had used it in twelve cases, but that no improvement was shown.

Chamberlin ⁸¹_{June, '95} reports one case of recurrent sarcoma of the tonsil in which marked, "though perhaps only temporary," benefit had been obtained.

J. B. Roberts, of Philadelphia, ⁹_{June 1, '96} treated 3 cases,—1 of

cancer of the lip, 1 of spindle-celled sarcoma of the inguinal glands secondary to sarcoma of the foot, and the third a case of recurrent osteosarcoma of the ilium. No good results were obtained.

M. H. Richardson, of Boston,⁹⁹ July 4, '95 stated that he had seen no benefit whatever from the use of either cancrin or erysipelas toxins for carcinoma. The results, after the injections of the toxins of erysipelas and of the prodigiosus in sarcoma, have been remarkable in the hands of Coley, however. In one case which the author had sent him, one of inoperable sarcoma of the abdominal wall, there was, at the time of report, not only complete disappearance of the tumor, although it was very large, but at the last examination there was a hernia in the scar resulting from the exploratory incision. At the time of the operation this incision extended into the tumor through the abdominal wall, into a mass as large as a child's head.

Koch, of Berlin,²² July 24, '95 gave an account of his experiences in four cases and stated that Krönlein had removed a sarcoma from the region of the sacrum, and on recurrence, under treatment by erysipelas toxin, the sarcoma had so far disappeared that only slight remains of the tumor could be detected; but, in spite of this, the patient speedily succumbed to a recurrence. In a case of goitre treated by Koch, himself, death took place in December, the treatment having been commenced early in October. Whether the smallness of the dose employed was the cause of the failure in all the cases he could not decide. Coley had used a dose two or three times as large as those he had given.

W. M. Donald, of Detroit,¹⁸⁵ Aug., '95 reports three cases,—one of sarcoma at death's door and one of carcinoma. Both of these temporarily improved. The third case, one of sarcoma, also improved; but neither of the three cases was cured.

Czerny³⁴ Sept. 3, '95 reports two cases,—one a woman, 35 years of age, with a sarcoma of the parotid as large as the fist, the other an advanced case of carcinoma of the upper jaw; softening of the tumors and material improvement resulted.

Fausto Campanini,⁹²¹ July 1, '95 reports two cases of sarcoma,—one of the nose and naso-pharyngeal cavity, the other of the breast. In view of severe toxic effects shown in one case and of the fact that no modification was perceptible in the tumor, Campanini sought to attenuate the toxins by exposing them to a very high temperature and diluting them with distilled water (1 cubic centimetre—15½ minims—of pure toxins in 60 cubic centimetres—2 fluid-ounces—of distilled water). Although the proportion of toxin was progressively increased, the growth of the tumor was not appreciably checked. Histological examination showed that there

was no trace of a retrogressive process. The results in both cases were negative. Campanini therefore concludes that the treatment is useless, while the serious symptoms which followed the first injections indicated a grave degree of intoxication.

J. F. Schmittle, of New Orleans, ¹²_{Dec., '95} reported three unfavorable cases in sarcoma; James Swain, of Bristol, ²_{Dec. 7, '95} an unsuccessful case. C. A. Morton, of Clifton, ²_{Dec. 28, '95} places on record the fact that he has used this method of treatment in two cases of sarcoma. The injections were commenced early in the growth of the tumor, but it grew rapidly during their use and finally obtained an enormous size before death. In both his cases, although he began with the smallest dose, the first general reactions were very severe, reminding one of the most marked reactions which occurred during the tuberculin treatment.

Of the conclusions bearing upon Coley's treatment, the following seemed to be based upon the broadest view of the question: Répin ⁹¹_{June, '95} considers that the observations of Lassar, Sprouck, and Coley, amounting at the time the paper was written to the number of sixty, establish beyond doubt the fact that streptococcous toxin, when injected into any part of the body of an individual affected with a malignant growth, will excite in this growth a rapid degeneration, which may extend even to necrosis and ultimately lead, in the most favorable cases, to radical cure. Notwithstanding frequent failures of any results on the tumors and the decidedly bad effects of the treatment on some patients, consisting invariably in rapid emaciation and often in rigors and fever, the author is still hopeful as to the future of this method of dealing with malignant disease. In such cases as, for instance, those of large lymphosarcomata, injections of streptococcous toxin will, he thinks, produce at least temporary amelioration and retard growth, and, if carried out with energy and perseverance, afford some chance of a radical cure.

Czerny, a few months later, ³⁴_{Sept. 3, '95} also reached the following conclusions:—

Considering that a distinct constitutional and local reaction takes place when the toxins are injected, that sarcomata especially may sometimes be cured, that the development of carcinoma is sometimes retarded, that the effect of the treatment soon passes off with bad sequelæ, and that it is only to be recommended in the treatment of inoperable cases, the method should always be tried.

Delbet, on the other hand, ¹¹⁵³_{July 13, '95} explains the variable amount of success obtained in the treatment of sarcoma, whether by erysipelas cultures, toxins, or serum, by the supposition that under the head of sarcoma many different pathological conditions are grouped.

No vaccinal material has, in his opinion, yet been obtained, nor has operative treatment been in the least degree supplanted.

Richet and Héricourt⁶_{May 11, '95} brought before the Academy of Sciences encouraging results yielded by the use of sero-therapy in the treatment of malignant disease. Réclus having removed an osteosarcoma of the leg, this tumor was crushed and mixed with a little water, and the resulting liquid, after having been filtered through linen, was employed to inoculate a donkey and two dogs. The inoculation produced no reactionary symptoms. After five, seven, and fourteen days, respectively, the animals were bled and the serum utilized in the treatment of two cases. The extraordinary success attending the treatment in one of the cases led Richet and Héricourt to doubt their diagnosis, but in a case of Terrier's there would seem to be no reasonable doubt. The case was one of sarcoma which had recurred in the same spot, and which was, thanks to the injections, reduced to one-third of its original size, with manifest advantage to the general health of the patient. Later in the year the same workers report³⁶⁰_{Dec., '95; Dec 28}² that they had been able to study the effects of the treatment in a much larger number of cases. Their own observations, together with those communicated to them by Réclus, Pinard, Terrier, Faure, Hallopeau, Tuffier, and others, amounting altogether to about fifty cases, led them to the following conclusions: 1. A very marked diminution of pain follows the injections; this effect had not been expected. 2. Cancerous ulcers become clean and assume the aspect of granulating sores, and may even heal over a fairly large extent of surface. 3. Marked shrinking takes place not only in the neighboring tissues and related glands, but in the growth itself. In some cases the development of the disease is checked and the general condition is distinctly improved. To sum up: In four-fifths of the cases a real improvement is beyond question, but a complete cure is not brought about. After a month or two new cancerous foci appear, and the disease goes on and ends in death. Is the serum specific or not? The authors find it difficult to give a definite answer to this question. The results seen in two cases, however, make them incline to the belief that the serum of immunized animals is much more active than that of healthy ones. In two cases also the serum seemed to have some effect in preventing recurrence, and they suggest to surgeons a trial of a combination of this treatment with the usual operative measures.

Féré¹⁰⁸_{Oct. 15, '95} states that a serum prepared according to the indications of Richet and Héricourt seemed not to modify the cancerous element itself, but to diminish tumefaction, hæmorrhage, and pain, and, in some cases, to markedly improve the general health.

Boureau, of Tours, ³⁶⁰_{Sept. 14, '95} treated 7 cases with the serum of an ass, following the method of Richet and Héricourt. His conclusions are as follow: 1. That the serum of animals that have received inoculations from cancerous tumors produces a rapid amelioration (six cases in seven) as regards pain, congestion, and suppuration. 2. That in the majority of cases this amelioration persists, but does not impede the course of the cancerous disease. 3. That, although the method is not curative of cancer in the strict sense of the word, it, nevertheless, constitutes a form of treatment superior to any employed at present.

Bompard, of Vitry-le-François, ⁴³³_{Dec. 21, '95} cited two cases which did not encourage him to continue his experiments with the serum treatment, and which led him to conclude that the remedy for cancer remains as yet undiscovered. Boinet, of Marseilles, ¹¹⁵³_{Aug. 24, '96} on the contrary, insists that the injections are not dangerous; he thinks it possible that, by using them before and after operations for cancer, recurrence may be delayed.

Emmerich and Scholl, ⁶⁹_{Apr. 25, '96}; ⁵_{Oct.} in following up the discovery of various well-known authors, that erysipelas has a direct influence upon cancer when it arises concurrently with it, have demonstrated that anthrax can be cured by the use of a serum derived from animals infected artificially with erysipelas. This fact and the conclusion to be drawn from it, that the bacillus of anthrax was destroyed by some property of the serum within the blood of the patient, lead them to believe that the cure of cancer by erysipelas is to be attributed to a like cause, and that serum from infected animals would produce the desired result as well as the filtrate from virulent bouillon culture of erysipelas cocci, as used by Coley, and without the dangerous symptoms which accompany that method of treatment. In their experiments and clinical research they therefore employed a serum derived from sheep infected with erysipelas; this was drawn with aseptic precautions, filtered through the Chamberland or d'Arsonval bacterial filter, and the serum preserved aseptically in a darkened chamber till used. They obtained lasting results, whose clinical history they detail except in two cases,—one of secondary infection and the other in which suppuration was going on, and in both of which the disease had progressed too far. In their clinical research they found the age of cancer had more effect than kind upon the result, but believe they have found a specific for the disease and probably also for sarcoma. The dose varied with the size of the tumor and other conditions, especially the condition and age of the patient. Small tumors required 15 minims to 1 drachm (1 to 4 cubic centimetres) daily. Sometimes 2 drachms (8 cubic centimetres) and even 1

ounce (30 cubic centimetres) was injected at different points into the tumor. Small doses produced no pain of moment, while repeated injections produced pain that lasted only a short time. Large amounts injected into hard tumors caused somewhat greater pain, but it lasted only a few hours. Fever was absent except when large amounts were employed, and then was moderate and short in duration. There was no interference with digestion or appetite, nor was headache complained of. The injection produced a local aseptic erysipelas, with slight redness and local œdema.

In the discussion of this paper before the Munich Medical Society ⁶⁷³_{July, '95} a spirited debate arose, in which the experimenters were rather severely treated, Angerer, in whose service Emmerich and Scholl made their experiments, stating that their statistics were not exact, since they had omitted three failures and included among the cases one of carcinoma now ulcerating and a case of cancerous cachexia in which death occurred in three weeks.

Bruns said that he had tried the serum furnished by Emmerich in six cases of undoubted cancer without observing the slightest therapeutic effect or the slightest diminution in the size of the growths. On the other hand, he did observe dyspnœa, cyanosis, marked elevation of temperature, weakening of the heart's action, and vomiting; and in one case there was even albuminuria, with casts in the urine. He emphasized the danger of these injections and urged caution in their use. Petersen reproached the authors for their undue haste, etc.

Emmerich and Scholl responded to these criticisms by pleading extenuating circumstances, declaring that the serum was pure when furnished, but had not been properly kept sterile, owing to faulty technique.

Freyrnuth ⁶⁹_{May 23, '95} employed Emmerich and Scholl's treatment in two cases. In one of these (epithelioma of the tongue) the patient was *in extremis* and the treatment did not avert death. The tumor itself, however, was greatly modified, appearing to undergo a kind of semifluid caseous transformation. In the second case (recurrent sarcoma of the upper jaw) the patient developed during the treatment a genuine erysipelas, which he communicated to his wife who was nursing him. He bore the attack well, however, and here also the effect of the serum treatment on the tumor was remarkable. The illness of the wife shows that the serum is to be used with the greatest care.

Schuler ⁶⁹_{No. 37, '95} related the case of a woman, 47 years of age, suffering for five years from a tumor of the right breast, which, under microscopical examination, showed all the characteristics of cancer. The diagnosis was confirmed by a colleague. Schuler

injected 28 cubic centimetres of the erysipelas serum of Emmerich and Scholl within a period of a week and a half. The tumor gradually diminished and softened and at the time of report had almost disappeared.

Fabre-Domergue ¹¹⁵³ June 1, '95; ² Aug 24 with reference to the results of Emmerich and Scholl and others, considers that: 1. Sero-therapy is logically applicable only to microbic affections or those which by their symptoms may be supposed to be such. 2. Cancer does not belong to this group in any of its characters, for (a) the fact of its more frequent occurrence in one neighborhood or house only proves that the exciting cause is more frequent there, and not that cancer is contagious; (b) a parasite is not necessary for the transplanting of a living cell, cancerous or not; (c) the pseudococcidia have not been proved to be parasites. 3. The facts interpreted to prove the curative action of serum injections (whether erysipelas toxin or the juice of a sarcoma) have the same value as those known before the modifying action of chemical substances (for example, oil of phosphorus, picric acid, pyoktanin, etc.). The latter, when injected, cause a local aseptic necrosis which attracts leucocytes; so that the part is absorbed and the tumor undergoes temporary diminution in size. The former act by their contained toxins exerting a negative chemiotaxic action, which in some cases may be of such extent as to lead to the same result. There is thus never any real cure of the whole disease.

Kopfstein ⁵⁷ Nos. 33, 34, '95; ² Sept. 21 has tried the action of three different strengths of serum from sheep inoculated with erysipelas streptococci in 15 cases of malignant disease; 13 of these were carcinoma, 1 sarcoma, and 1 malignant lymphoma. In almost every case the injection was accompanied by violent burning pain in the tumor, often lasting some hours, and very marked general symptoms. Ulcerated growths showed well-marked reaction to injection. The base took on a healthy appearance, the fetid secretion disappeared, and the edges became flatter and eaten out. In some cases the whole basis and margin softened and numerous islets of soft, red tissue shot up on the healthy soil. Histological examination of these, however, showed granulation-tissue containing cell-nests with perfectly-formed cancer-cells. The secondary growths were in no instance affected. The only action upon malignant lymphoma was clearing up of a gangrenous ulcer, while a sarcoma of the ilium became larger after injection and the patient developed sciatica, which had not before been present. Kopfstein hence considers the action of this serum to be purely local, the tumors undergoing alteration only in the immediate neighborhood of the injections. Even where diminution of the growth occurs,

which is mainly in ulcerated cases, no prospect of cure can be held out. He strongly indorses Bruns's view that this new method has not advanced the non-operative treatment of malignant disease.

Taking the serum treatment as a whole, Berger, of Paris, ¹⁵²_{Nov. 15, '95} concluded that practical experiments, either with sterilized cultures of erysipelas, according to Coley's method, or with Richet's and Héricourt's serum, should be made only in cases of inoperable tumors. Interstitial injections of Coley's serum into the tumor might be tried in inoperable sarcoma, since it has not been demonstrated that this method cannot effect recovery. Good effect might also be secured in inoperable cancer from the use of Richet's and Héricourt's serum. By pursuing these attempts, modifying the methods and procedures as future research may indicate, it is possible that a remedy may some day be found against one of the greatest ills of humanity.

Miscellaneous Measures.—According to O. Hasse, of Nordhausen, ³_{Oct. 16, '95} traumatism through examination of a tumor to be operated on should be carefully avoided. The bad effects of violence upon the growth and multiplication of malignant tumors is well known, yet the majority of surgeons do not hesitate to palpate and roughly handle them in clinical examinations. Indeed, Hasse has most frequently observed post-operative recurrence in patients who had consulted a number of practitioners, those who had been examined seldom being generally exempt from a return of the disease. A second point of importance in preventing reproduction is preparation of patient for operation by injecting alcohol about the neighborhood of the growth for some weeks previously. Hasse uses a mixture of 30 parts of absolute alcohol to 70 parts of water, making the injections twice a week around the tumor, as well as into any infiltrated glands. The quantity injected varies according to the size of the neoplasm and sometimes reaches 20 Pravaz syringefuls. The only inconvenience is the pain and occasionally slight intoxication. In order to avoid making the injection into a vessel Hasse inserts the syringe-needle deep into the tissues, then unfastens it, leaving the cannula in place, then waits a moment; if blood does not issue from the cannula he re-adapts the syringe and makes the injection; but, if blood does flow out, he removes the needle and makes another puncture elsewhere. Under the influence of these injections the tumor diminishes in size, becomes less painful, and is surrounded with a protecting area of sclerosed tissue which prevents the migration of infectious germs and recurrence after operation. In some the injections cause complete disappearance of the growth, and thus render radical intervention unnecessary. In these instances

the alcoholic treatment should be continued for a certain period after apparent cure, at intervals more and more prolonged.

J. W. Young, of Bloomfield, Ia., ¹⁰⁶³_{July, '95} has employed alcohol as a curative measure, injecting it with a common hypodermatic instrument into various tumors, and has been surprised at the rapid diminution in the size of the mass. He found that, if too much alcohol is injected at one time, there is a little danger of sloughing of the part and general intoxication of the subject; but with ordinary caution there is little danger of these accidents. His plan is to inject 10 to 20 minims (0.65 to 1.3 cubic centimetres) in one side of the tumor, then as much in another place, and continue till every part is touched by the alcohol.

With the primary purpose of more accurately defining the boundaries of facial growths, C. M. Fenn, of San Diego, Cal., ⁶¹_{Apr. 27, '95} employed a saturated solution of citric acid hypodermatically, and found that the liquid introduced at any point near the periphery seemed to possess an elective affinity for the diseased structures, and that it blanched and brought the same into bold relief. Continuing the injections for several days, sometimes at the request of the patient, he further discovered that the area of induration and infiltration was measurably reduced. In some instances no other surgical interference was required. The acid seems to be quite innocuous to normal tissues. The patient experiences instant relief from the smarting and tension which attend certain neoplasms.

Goodman ⁴³_{Apr. 20, '95} ⁸⁰_{Aug. 15} recommended the leaves of *phytolacca decandra* for destroying epithelioma. The method of using the remedy is to bruise the green leaves to a pulpy mass; collect the expressed juice in a shallow receptacle, as a plate; allow it to evaporate to a thick, pasty consistency; spread a portion of this on a piece of silk or other suitable cloth, and apply to the morbid growth. The plaster should be removed and the part washed twice daily. The remedy causes severe pain. It has a selective action for the morbid tissue; follows out all the irregularities of the epithelioma; causes, as it were, its liquefaction and removal, and then acts as a cicatrizant for the open sore. As soon as all the morbid tissue is destroyed, a bed of cicatricial tissue begins to spread from the periphery, and as this occurs the plaster should be cut smaller each day, so as to conform to the size and shape of the surface to be covered by it. Under this treatment the writer has seen large epitheliomatous masses destroyed in a few weeks and nothing but a faint scar left at the place occupied by the growth. In no case was there a recurrence at the original site. Unlike other remedies, it can be used fearlessly, does not endanger the patient, combines within itself a caustic action and healing

property, and requires to be used in the same manner from beginning to end.

Von Mosetig-Moorhof, of Vienna, ¹⁶⁹_{Jan., '96} discussed the treatment of inoperable malignant tumors by the aniline dyes, stating that it is now five years since he had announced the possibility of curing such tumors by the injection of these dyes into the growth. He still maintains that his first assertions were well founded, and cites cases to prove them. Methyl-violet seems to have given the best results. It has been employed in powder, solution (1 per cent.), or in collodion (1 to 30); this last method, although rather painful, has the advantage of being less costly, of more easy application, and of greater activity. One application daily is generally sufficient.

[These remedies have been mentioned in order to satisfy the needs of practitioners who may encounter unsurmountable resistance, on the part of patients, against operative procedures or to serve as last resorts in inoperable cases. The views of the prominent surgeons who have written on cancer during the year may be said to be represented by the conclusion reached by Roux, of Lausanne, ³_{May 8, '96} that very often we operate too late, when it is impossible to prevent a relapse. This fact darkened the earlier statistics and continues to darken the present ones. As soon as the diagnosis is assured we should intervene by the bloody method, always making a systematic and carefully-detailed toilet of the ganglionic chain, even if it is healthy in appearance. There is no doubt that early operations will prevent relapses, since in the deplorable conditions under which we now operate we actually have some cures. Roux cited at hazard cases of gastro-intestinal cancer without apparent relapse for three years; cancers of the rectum without relapse after four years; a cancer of the uterus, which had invaded the vesical walls; a villous cancer of the kidney of extraordinarily difficult extirpation and without relapse for five years. He had removed the tongue in a case that had relapsed nine years after an operation by Kocher. Among his cases was one of survival for eleven years from cancerous goitre, and a cancer of the testicle that had not relapsed at the end of twelve years. Histological examination had left no doubt as to the nature of these tumors, and literature bears witness to the superiority of the knife over any treatment yet discovered. To thoroughly realize the importance of this is all the more necessary, since the fact that cancer and other malignant growths are undoubtedly on the increase in the human family. Joseph D. Bryant, of New York, ⁶⁷³_{Dec., '96} demonstrated this fact to the New York State Medical Association by statistics showing that in the United

States the mortality from cancer in 1850 was 9 for 100,000 living; in 1860 it was 11.7; in 1870, 16; in 1880, 26; in 1890, 33.5.—E. L.]

The prognosis of cancer, as modified by early detection and prompt ablation, was considered by J. W. S. Gouley, of New York, ^{Dec 21, '95} and led to his formulating the following conclusions: 1. According to the statistics published during the past thirty years, malignant tumors appear to exceed benign tumors in frequency. This is not unlikely to be, owing to the fact that benign tumors have not been more generally excised in the early period of their development, but have been allowed to become malignant. 2. While some external malignant tumors were never benign, it seems that many external benign tumors become malignant and that some external malignant tumors tend to become benign. 3. It does not seem irrational to regard a benign tumor as potentially malignant and *vice versa*, since it contains all the essential elements which, perhaps, some accident awakens into activity. 4. The vast majority of external carcinomata and sarcomata of the mammary glands seem to be developed from diffuse and circumscribed adenomata. 5. The often-reiterated dictum, that "so long as a tumor is stationary and causes no inconvenience it should not be removed," is contrary to true principles of conservatism and is fraught with the greatest danger to sufferers. 6. The ill-founded opinion, that "extirpation of a quiescent malignant tumor only serves to stimulate the extension of the disease," has prevented the early ablation and therefore the cure of many tumors, and is responsible for the great mortality due to procrastination. 7. The early excision of malignant growths does not invariably increase the chances of cure, for there are cases of very small tumors which were promptly removed and which recurred so speedily and soon attained such dimensions as to be inoperable. This is particularly the case with small, round-celled sarcomata and with multiple "melanosarcomata." 8. The early excision of certain sarcomata and carcinomata very frequently modifies favorably their prognosis, the period of immunity from recurrence of the disease being prolonged sometimes indefinitely. 9. As soon and as often as a tumor recurs, it should be excised. Cases illustrative of the good effects of this practice are rapidly increasing in number. 10. The early excision of external benign tumors may often be regarded as prophylactic of malignant disease. 11. Scarcely any tumor is too small to be excised. 12. In the case of a malignant or of a suspectedly malignant tumor it is imperative to excise not only the morbid growth, but also the apparently normal ambient connective tissue and lymph-glands, to carry the dissection far beyond the

diseased tissues, and to take measures likely to insure rapid cicatrization of the wound. 13. Applications of nitrate of silver, of arsenical pastes, and of other escharotics to many tumors have generally proved worse than useless, and have been known to excite the rapid extension of the local disease and, in the case of malignant tumors, to cause their propagation to the internal organs, leading speedily to a fatal issue. 14. The value of constitutional treatment after the excision of malignant tumors is unquestionably great. This treatment generally consists in the use of reconstituents and of such other means as may be needed in the endeavor to re-establish and preserve the equilibrium of the bodily functions. None of the internal medicines proposed and given as specifics against malignant cancers have ever been of any service.

F. S. Dennis, of New York, ⁹⁶_{Oct. '96} presented to the American Surgical Association the clinical histories and microscopical examination of a series of cases of malignant disease cured beyond the three years' limit of time. In cases of epithelioma of the face he had no mortality. Of 97 amputations of extremities there was but 1 death, and this was due to hæmophilia,—practically no mortality. Of 97 amputations of the breast there were 23 cases of sarcoma and other tumors than cancer, leaving 74 cases of pure cancer. Of these he had subsequent histories of 43 cases; 3 of these have not yet reached the three years' time limit. This leaves 38 cases of cancer in which subsequent histories are in his possession. Of these there have been 17 permanent recoveries,—45 per cent. Among these 38 cases there were but 2 local recurrences,—about 5 per cent. These are statistics published by him prior to 1891. Since then he has had 15 cases of pure cancer of the breast, with no mortality from the operation itself and 2 deaths from other causes. He emphasized the importance of early removal of benign tumors, particularly because their presence is liable to excite the development of malignant growth, and because we can never know when the change from benignity to malignancy may begin to develop.

Lipoma.

Albert Mathieu ¹⁰⁰_{Mar. 26, '96} saw two lipomata, or pseudolipomata, of the thigh in a woman affected with tabetic arthropathy of the knee, and regards the case as an argument in favor of the theory attributing pseudolipoma to a trophic disturbance of neuropathic origin. A deformity of the lower limbs resembling elephantiasis may be seen in analogous conditions in tabes, and is of the same order. Neuropathic pseudo-elephantiasis must be classed with pseudolipoma and neuropathic lipoma as a peculiar clinical type.

Kouzmine, of Kazan, ⁵⁸⁶_{No. 13, '96} reported a case of arborescent

lipoma in a man 22 years of age. Surgical intervention showed that the synovial cavity was filled with arborescent vegetations—polypus—implanted upon the thickened, reddish synovia. The articular cartilages were intact. The entire synovial membrane was cut out with scissors and the wound closed after antiseptic irrigation. The tumor was formed of fibrous connective tissue with star-shaped and fusiform cells, alternating with adipose tissue. In certain sections young connective tissue predominated with tubercles in different stages of development in the centre. But 11 cases of arborescent lipoma have thus far been recorded,—3 by Russian authors; the present case forms the twelfth. Of this number the tuberculous nature was ascertained in 5 cases, in 4 others tuberculosis was noted in the neighborhood of the growth, and in 3 cases the evolution after extirpation was the same as in recurrent tuberculosis. In spite of this, arborescent lipoma is not placed by classical authors among tuberculous joint affections.

De Bersaques, of Ghent, ¹⁴_{Dec. 23, '94} presented to the Belgian Surgical Society a rare case of lipoma of the hypothenar eminence of the hand. Kirmisson, in a recent study, ²¹²⁵_{'95} estimates that not more than six cases of lipoma of the fingers and twelve of the palmar region have been placed on record.

D'Arcy Power ²_{Nov. 23, '95} exhibited to the London Pathological Society a case of diffuse lipoma of the hand and fingers which might be classed as one of macrodactyly. The patient was a child, and the swelling, which was at first trivial, affected the thumb and index finger. Had operation been performed early, amputation might possibly have been avoided.

Lundin, of Stockholm, Sweden, ⁶⁷³_{June, '95} reports the case of a 52-year-old man from whose abdominal cavity he extirpated a lipoma 60 centimetres long, 40 centimetres wide, 20 centimetres at its greatest thickness, and weighing 17 kilogrammes (37½ pounds).

Frarier showed to the Lyons Medical Society ²¹¹_{Dec. 1, '95} a large lipoma removed by Gangolphe from the thigh of a man 60 years old. Its evolution had extended over a period of ten years, and it was only ten months before operation that its growth became rapid. It was a subaponeurotic tumor, freely movable, and without adhesions. It was regarded as a lipoma that had undergone sarcomatous degeneration.

Myxoma.

F. Curtis, of Lille, ¹¹⁵³_{Sept. 28, '95} ²_{Oct. 26} describes a form of contagious and inoculable myxoma which is produced apparently by the proliferation of a micro-organism resembling the yeast-fungus in the connective tissue. The tumor on which the observation is based was

removed from Scarpa's triangle (right side) of a healthy young man, a locksmith, where it had been growing for about two months and had attained the size of two fists. As it fluctuated, it was incised, on the supposition that it contained pus,—a diagnosis favored by the co-existence of a large, fistulous abscess in the lumbar region of the same side. On incision the swelling was found to consist of a soft, gelatinous tissue. It and the abscess-sac in the lumbar region were dissected out; the morbid growth did not extend to the deeper structures, but lay between the skin and the muscles. Under the microscope the growth showed a few connective-tissue fibres and an enormous crowd of large, yeast-like cells, each cell being surrounded by a thick, gelatinous, hyaline capsule. The cells for the most part were spherical; some of them showed buds; all of them exhibited the microchemical reactions of cellulose. The cells grew rapidly on potato and gelatin, losing their gelatinous envelope and multiplying by gemmation. A fragment of a tumor implanted in a rabbit gave rise, in the course of twelve days, to a tumor the size of a small orange; this experimental tumor contained the yeast-like fungus in abundance, though not in a state of absolute purity.

Cysts.

Sebaceous Cysts.—According to Louis de Gaulejac, ²⁰⁰⁰/₉₆ sebaceous cysts are benign tumors without any tendency to undergo resorption. They should be made to disappear, since they may ulcerate, give rise to a canceroid, and cause deformity by their size and situation. Ablation with the bistoury is the only treatment admissible. Cocaine should be used and the operation antiseptically performed. Recovery is rapid and by this method is attended with no complications.

David, of Lille, ²²⁰/_{Dec. 21, '96} observed a sebaceous cyst of the nape of the neck, of large size. The situation of the growth was a rare one. Kerbiriou, of Lille, ²²⁰/_{Dec. 14, '96} removed twenty-two sebaceous cysts without using suture or ligature. The bistoury, blade upward, was used to incise at once, antero-posteriorly, the skin and the wall of the sac. A spatula was introduced into one of the extremities of the wound, penetrating the loose cellular tissue surrounding the cyst and easily enucleating the latter. Compression was then made by means of a cotton tampon soaked in carbolized solution, hæmorrhage being slight. The patient was recommended to wash the head twice daily in sublimate solution. Recovery was rapid, union taking place by first intention in five-sixths of the cysts, the cicatrix being barely visible forty-eight hours after operation. The others healed completely in five days.

Epidermoid Cysts.—In reporting a case of epidermoid cyst of the finger F. M. Briggs, of Boston, ⁹⁹_{July 4, '95} reviews the literature upon this variety of growth, variously called dermal, epidermal, implantation, and traumatic epithelial cyst. Briggs found 18 reported cases. Garré, of Tübingen, who reported 2 of them, states that 29 such cases have been recorded previous to 1894. The first case of the kind was reported by Rizet in 1866.

J. Bland Sutton, of London, ²_{Mar. 2, '95} described a case in a housemaid, aged 18, who presented a hard, ovoid tumor growing on the thumb. It was distinctly circumscribed, firmly connected with the skin, and could be moved from side to side over the sheath of the flexor tendon. It had been slowly growing during three years and had reached a size which caused inconvenience in using the thumb, but it had never been a source of pain. This kind of tumor was formerly described as “sebaceous cyst of the finger,” but a careful study of the structure and history led the author to conclude that it had nothing in common with sebaceous cyst, the mode of origin excluding it from the genus dermoid. In his opinion the term “implantation cyst” is a useful one, as it enables the student without effort to remember the peculiar mode of origin of such tumors. Implantation cysts are produced in a variety of ways,—for example, punctures by awls, forks, needles, thorns, glass, etc.; wounds made by knives, teeth, or falls.

W. Thelwall Thomas, of Liverpool, ¹⁸⁷_{July, '95} describes four cases of epidermoid cysts of the hand, and reaches the conclusion that traumatism explains the production of these cysts, and that the term “implantation cyst,” used by Bland Sutton, is an admirable one, seeing that they can so easily be produced experimentally, and from the nature of the epithelial lining.

Dermoid Cysts.—A. le Dentu and Pierre Delbet ²⁰⁹⁶_{'95} sum up the pathogeny of dermoid cysts as follows: The different character presented by heterotopic tumors—or dermoid cysts, to use the more current expression—and the almost constant relation between their seat and their degree of complexity, lead to the conclusion that they are not all of the same nature and that their pathogenesis is not always the same. It is probable that the simple dermoid or mucoid forms are produced by the mechanism of inclosure; but this theory does not explain cases in which embryonal *débris* are found. These are due to two different pathogenic processes, according to their location. Cysts situated in the region of the jaws, the sacro-coccygeal, perineal, or scrotal region are due to diplogenesis. These are double monsters, which have become atrophied and adherent like parasites. They were formerly attributed to the simultaneous development of several ovules, but

are now considered as due to hyperfecundation,—that is to say, to the penetration of several spermatozoids into the same ovule. The double monsters thus spring from a single ovule. The complex dermoid cysts, containing fetal parts, but more deeply situated, and which may be called visceral, as those of the ovary or of the testicle, are very probably due, on the contrary, to parthenogenesis. This theory explains the majority of cases, but it would be an exaggeration to contend that it leaves none of them in obscurity. Extra-cranial dermoid cysts were considered by A. Chipault, of Paris, ³¹_{Oct. 12, '96} in connection with three cases under his observation.

A cervical dermoid was seen by J. Bland Sutton, of London, in a man 23 years of age. ²_{Mar. 2, '95} It was about the size and shape of a Tangerine orange and situated on the neck immediately above the sternum. On close examination the author found that it could be molded with the fingers and made to assume any shape, like so much plastic clay. The walls of the dermoid were very thin, and the cavity contained putty-like material and a few light-colored hairs. Dermoids in this situation are very unusual; this is the only example which has come under his observation. A not uncommon position for dermoids is the middle line of the anterior wall of the thorax, at the level of the mesosternal joint.

Van Duyse ¹¹⁶⁰_{Apr. 18, '96} found a brain and a rudimentary eye in a dermoid tumor expelled by the rectum. According to Baumgarten the presence of ocular formations in dermoids is quite exceptional. Van Duyse believes, with Calbet and Dareste, that the diplogenetic evolution of these tumors is confirmed by cases like his own.

Hydatid Cysts.—It is generally admitted that multiple hydatid cysts are due either to repeated infection or to the simultaneous penetration of a number of embryos of the echinococcus. Sklifossovski ⁸⁵²_{v. 5, No. 1, '96} believes this opinion to be erroneous, since multiple cysts are most frequently observed in countries in which hydatid cysts are rare, as Southern Germany and Switzerland, and that, on the other hand, they are rare where hydatid cysts are, in general, frequent, as in Iceland, Prussia, and Mecklenburg. He states that Ratimoff is of the opinion that multiple echinococci of the peritoneum are primary and due to the simultaneous penetration of a number of embryos, and that the best method of curing them is by extra-peritoneal intervention, as juxtapubic laparotomy or lumbo-sacral resection. Langenbuch and Tillmans, on the contrary, believe in the possibility of inoculation, and prefer intervention in two stages, in order to avoid dissemination of the scolices throughout the peritoneum.

Reboul, of Nîmes, ¹⁴_{Oct. 28, '94} reported five cases of hydatid cysts of the muscles, of interest as illustrating the errors of diagnosis to

which such growths may give rise. For instance, in a case of hydatid cyst of the thigh a diagnosis of sarcoma of the bone had first been made, then of ossifluent cold abscess, then of coxalgia; in an hydatid cyst of the pectoralis major inflammation of the adjacent bursa had been suspected; an hydatid cyst of the elbow co-existing with the muscular cyst had been taken for hygroma. In these cases diagnosis was made only after incision of the sac.

A peculiar position for an hydatid cyst was noted by Gregory Sprott, of Hobart, Tasmania. ²⁶⁷_{Nov. 20, '95} The patient was a woman, 32 years of age, whose left cheek was much swollen. She could only open her mouth a very little way, and that with great difficulty. There was a pus-like discharge from the mouth. Her temperature was 102° F. (38.9° C.). The two front molars of the left upper jaw were quite loose. The front one was much decayed, but the second quite sound. Sprott removed them, but the soft, elastic swelling still remained. While swabbing out the mouth he noticed a white-looking structure protruding from where he had extracted the teeth. This, as he pulled it out with the forceps, proved to be an hydatid cyst about the size of a duck-egg. Immediately it was removed the swelling disappeared, and the patient felt no further pain. She left the hospital, two days later, well.

Actinomycosis.

This disease, according to E. Hummel, of Tübingen, ⁷⁶¹_{B. 13, H. 2, '95} ⁹⁶_{Jan., '96} occurs most frequently among workers in grain, who are in the habit of chewing bits of hay, grain, etc. He reports a case of actinomycosis of the upper jaw, caused by a piece of oat-chaff, which had evidently entered through the mucous membrane of the mouth. The author believes that actinomycosis is not communicated directly from animals to man, nor by eating the flesh or milk of diseased animals, but that animals and men are infected from a common source. The most frequent carriers of the disease are pieces of grain which are forced through the mucous membrane or enter about carious teeth. Foreign bodies of this kind have been found very frequently in animals suffering from the disease; but if not found, it does not invalidate the theory, since pieces of grain and vegetable matter are soon absorbed and disappear entirely. An instance related by Marten, of Adelaide, ¹¹⁸⁷_{Nov., '94} is peculiar, since it appears to be the only one in which the ray-fungus has been found primarily in the extremities. Madura foot must be expected, however, as Hewlett has conclusively shown that this is due to actinomycosis. In the case reported the fungus obtained entrance to the thigh; how this occurred is unexplained, though it probably entered by some breach of surface during a camping-out

expedition which the patient had attended. In Ransom's case the sufferer had eaten freely of fresh ears of barley and wheat three months previously.

Poncet, of Lyons, ²¹³_{Apr., '95} reported six new cases, all confirmed by microscopical examination. When added to the cases already published, these show that the disease is not so rare in France as has been supposed. The author states that the undoubted influence exercised upon the disease by iodide of potassium countenances the suspicion that many patients, supposed to be syphilitic and cured by the iodide, have been really actinomycotic. It is probable, too, that actinomycosis, in its frequent seat at the angle of the lower jaw—where it gives rise to diffuse bogginess of the tissues, trismus, and abscess—has been sometimes mistaken for a different condition due to disease of a wisdom-tooth.

In reporting seven cases of dental origin in which Dubreuilh and Frèche ²⁸⁷_{Nov. 8, 9, '95} had obtained good results from iodide of potassium in doses of from 2 to 6 grammes ($\frac{1}{2}$ to $1\frac{1}{2}$ drachms) a day, the authors express the opinion that this drug acts by modifying the anatomical elements and preparing them for the defense of the organism, and not by killing the germ of the disease. This is an interesting point, as actinomycosis is not a rare disease, and cases begin to be frequently reported as the affection becomes better understood. Owing to the fact that the maxillary bones and the teeth are generally the first involved, dentists and surgeons will be most frequently brought in contact with the disease. Bérard, of Bordeaux, ²⁰⁹⁷_{'95} in some experiments made under Dubreuilh, found that iodide of potassium, even in strong portions, does not form an unfavorable culture-medium for the actinomyces, but that they grew equally as well in it as in media of other kinds. It is thus evident that the remedy does not act directly on the diseased tissues, but, as before stated, upon the anatomical elements. It is impossible to say, however, just how the drug does act, or whether, before acting, it undergoes some transformation in the organism. Cases in which complete recovery was obtained by means of iodide of potassium are reported by Zechmeister ⁶⁵⁰_{No. 13, '95} and R. Van Arsdale, of New York. ⁹⁶_{Sept., '95}

[To report all the cases recorded during the year in all parts of the world is not considered necessary, owing to the similarity of symptoms and history in almost all instances. The sudden increase in number of cases is doubtless due to the fact that the disorder was not recognized in the majority of patients until recently. Farmers should be warned against the habit, so common among them, of chewing bits of straw, wheat, oat-chaff, etc., which have been shown to be the most prolific cause of the disease.—E. L.]

SURGICAL DISEASES.

BY THE CENTRAL EDITORIAL STAFF.

SUBMITTED FOR COMMENTATION TO

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Tetanus.

Etiology and Pathology.—Sidney Martin ⁶_{Nov. 2, '95} gives a preliminary report of his investigations upon the chemical pathology of tetanus, his general conclusions as so far obtained being: (1) that in all cases of traumatic tetanus there are present, in the spleen and in the blood, the products of bacterial action,—viz., albumoses and certain acid organic bodies; (2) that to the albumoses must be ascribed the production of the fever of tetanus,—they produce no tetanic convulsions; and (3) that the other extract contains the substances which are the direct excitants of the muscular spasms in tetanus.

Vincenzi, ⁵⁸⁹_{Sept. 4, '94}; ²_{Dec. 8} in studying the bacillus of tetanus from four distinct cultures from different sources, happened to obtain certain specimens which grew well aërobically. These appeared to be identical, both to the naked eye and in respect of their virulence, with the specimens of the bacillus grown in absence of air, and are the first recorded instances in which an observer has succeeded in growing the bacillus of tetanus save in a medium almost free from oxygen. The possibility that the tetanus bacillus is capable of growth in the presence of air helps to explain its presence and development in earth, where it is usually found, and obviates the necessity for any elaborate theory to account for this apparent anomaly. Continuing his experiments, Vincenzi ⁵⁸⁹_{July 31, '95} found that the toxins of Nicolaier's bacillus could not be observed in the blood of a guinea-pig into which a quantity of toxin sufficient to cause death had been inoculated through the leg. To cause death through the vascular system it was necessary to give a dose six times larger than was required subcutaneously. The

symptoms produced by the subcutaneous injection of doses insufficient to cause death were not aggravated if a larger dose were at the same time injected into the blood, or if the second inoculation were made when the localized tetanus had become stationary. A part only of the toxin injected into the blood was enough to produce tetanus; a large quantity of the toxin remained in the circulation until the death of the animal.

Meinert⁹⁵_{B.44,'95} has had three cases of tetanus in his gynæcological service during a period of eight months. In all of these cases the same catheter had been used for intra-uterine injections, and the author thinks that this instrument carried the infection from the first patient to the two others. It was supposed to have been disinfected by plunging it in boiling water for ten minutes and then placing it in a 5-per-cent. solution of phenol. According to Kitasato these measures are not sufficient to destroy the organisms.

Courtin, of Bordeaux,¹⁸⁸_{Nov.17,'95} in describing a case seen by him, was inclined to attribute some etiological importance to the dampness of the room on the ground-floor which the patient occupied. Though the theories of equine or telluric influences are fascinating, cold and dampness must not be forgotten as factors much feared by Larrey for his wounded, and to which he attributed the fearful epidemics of tetanus described in his memoirs.

H. F. Lawrenson, of Dunlavin, Ireland,²_{Dec.28,'94} observed a fatal case of tetanus from a chilblain; and P. Chevillot, of Pont-l'Évêque,³⁵_{Mar.23,'95} one following frozen feet. In favor of the equine theory of tetanus, the latter author adds that before having his feet frozen the man had been occupied in caring for horses.

A fatal case of tetanus was observed by S. C. Godfrey, of New Zealand,⁵⁵⁷_{Oct.1,'95} in a shepherd suffering from burns of both hands, right groin, right chest, and right leg, received the day previously through carrying in his pocket some phosphorus, which ignited. The burns were of the third degree.

A case of tetanus in an infant after circumcision is recorded by A. Schirman, of New York.¹_{Aug.3,'95} A case of the chronic form following extirpation of the cervical glands was observed by Samain, of Lille.²²⁰_{Oct.20,'94}

Berthier, of Lyons, at the French Congress of Internal Medicine,¹⁴_{Nov.28,'94} related the case of a patient in whom hysterical symptoms followed tetanus. There was no hereditary neuropathy, alcoholism, tuberculosis, or arthritism. The exciting cause in this case must have produced the hysteria without the intervention of any hereditary predisposition.

Molle, of Aubenas,²²⁸_{Nov.16,'95} observed polymorphous erythema and intestinal hæmorrhage in the course of a subacute attack, and

suggests that the appearance of such an erythema is confirmatory of an attenuated form of infection.

Etiology of Non-traumatic Forms.—Kamen⁵⁰ ^{Nov. 9, '95} ¹¹² ^{Jan., '96} reports a case of tetanus in a soldier, of 41 years, with no history of traumatism, who had felt unwell for about six days, but who during the first three was still able to perform his military exercises. The condition became rapidly worse after being overheated, and was accompanied by stiffness in the neck and jaw. In two days it was necessary for him to enter the hospital, where, thirty-six hours after, death from tetanus occurred. In addition to his statement to that effect, the most careful examination at the necropsy failed to reveal any wound. Faecal impaction was discovered in the intestine, and, as the tissues in the neighborhood seemed abnormal in appearance, cover-glasses were spread with the intestinal contents, stained, and examined. In addition to numerous other bacteria of small importance, a large number of drumstick bacilli with large, round spores, exactly corresponding to the tetanus bacillus, were found. Attempts were made to produce tetanus in inoculated guinea-pigs by heating the contents of the intestine mixed up in distilled water and heated for half an hour to 80° C. (176° F.), but without result.

Kamen calls attention to the fact that heating of cultures often seems to destroy the virulence of the bacillus, and he does not regard the failure of the experiments as conclusive. He is not of the opinion that the case was caused by the absorption of a tetanic toxin from the intestine where it was produced, and quotes Sormani, Tolledo, and Veillon, whose experiments show that the tetanic toxin is destroyed by the digestive juices. He thinks it more probable that through microscopical lesions of the gut the bacilli which it contains find a way into the system. Cases of so-called reflex tetanus can thus be explained. Carbone and Per-rero¹⁴ ^{June 23, '95} communicated a case of tetanus from cold, in a healthy young man, who, after being out in the rain for a whole day, suffered from contracture of the jaw. This was soon followed by all the symptoms of generalized tetanus, and he died on the third day. Being unable to find the least wound which would explain the infection, the authors sought and found the bacillus of Nicolaier in the bronchial mucus, inoculations of the latter into rabbits causing death by tetanus. The case is interesting as throwing some light on the etiology of so-called rheumatic tetanus, and as showing the direct influence of cold on the development of infectious agents.

Cephalic Form.—De Forest Willard and James I. Johnston, of Philadelphia, ¹¹² ^{Jan., '96} report a case of cephalic tetanus with recovery.

This form—a unilateral facial paralysis associated with tetanus and due to injury to part of one of the cranial nerves—is rarely met with. The patient, a boy of 12 years, while at play was struck by a small, dirty stick, possibly soiled with manure, and had the skin near the inner canthus of his right eyelid slightly torn. The wound was dressed twice, and a week later the boy was found to have paralysis of the facial nerve of the right side of the face, with trismus and a spastic gait. He was unable to whistle or to open his jaw. The symptoms became more marked and tendency to opisthotonos increased. The position of the cicatrix made it impossible to excise it without subsequent eversion of the eyelids; so a tenotome was slipped under it to loosen it from the underlying tissues. This led to decided improvement, probably by dividing the nerve-filaments.

The patient was kept in a dark room at a temperature of 72° F. (22.2° C.) and guarded from draughts, noises, etc. The diet was milk exclusively. The bowels were kept open with calomel and salines, and bromides, chloral, and opium were given in increasing doses until 75 grains of bromide, 30 of chloral, and 36 drops of deodorized tincture of opium were given daily, and maintained for four or five weeks. During convalescence milk-punches containing 2 drachms of whisky were given three times daily.

Larger, of Paris, ¹⁴_{Dec. 2, '94} records a case of cephalic tetanus following a wound of the finger-nail. Amputation was done eighteen hours after the appearance of trismus, but the patient died next day from cardiac syncope.

A case of cephalic tetanus is recorded from the service of Gougenheim, of Paris, ¹⁷_{Sept. 28, '95} in a patient who also presented marked symptoms of dysphagia,—symptoms which have given to this form of the disease the name of dysphagic or hydrophobic tetanus. The affection, which at first appeared benign, became generalized, and death followed, as it usually does in cases of cephalic tetanus in which the disease does not remain localized in the head.

Antitoxin Treatment.—The action of tetanic antitoxin has been studied by S. Fedoroff, of Moscow, ⁵⁰_{Sept. 26, '94} with a view of ascertaining whether it directly destroyed the tetanic poison or acted only by indirectly protecting the organism against the influence of the virus. In the course of his experiments the author found that unprepared animals injected with a mixture of poison and antitoxin, which had stood *in vitro* for one hour at the ordinary temperature of a room, died unless the ratio of antitoxin to poison was 2 to 1 or more. He also found that animals previously prepared by antitoxin injections survived the injection in varying

strengths when the mixture had been exposed to room-temperature for periods varying from twenty-four hours to a quarter of an hour. But four of these same animals died from the injection of the same quantity of poison alone, even when 0.05 gramme ($\frac{7}{8}$ minim) of antitoxin was simultaneously injected. From these experiments Fedoroff claims that the action of tetanic antitoxin is truly a destructive one; at any rate, *in vitro*.

Nocard, of Alfort,^{3, 6}_{Oct. 23, '95; Nov. 2} calls attention to the fact that, while being extremely sensitive to the influence of heat, the toxin of tetanus shared with that of diphtheria the property of filtering virtually intact through porcelain. It is possible to procure some specimens of tetanic toxin capable of killing the guinea-pig at the dose of $\frac{1}{500}$ cubic centimetre; and Nocard has succeeded in killing strong horses with an injection of only $\frac{1}{10}$ cubic centimetre, or 2 drops, of this same toxin. Animals subject to tetanus can, however, be rendered refractory to these poisons by the inoculation of minute doses of the pure toxin or of the toxin previously heated to 65° or 70° C. (149° to 158° F.) or, again, of the toxin mixed with weak Gram's solution. The inoculations should be frequently repeated at more or less short intervals and the dose injected gradually increased. Roux and Vaillard, as also Nocard himself, have thus succeeded in immunizing certain horses who subsequently remain indifferent to a massive injection in the jugular vein of 250 to 300 cubic centimetres (8 to 9½ fluidounces) of tetanic toxin,—a quantity sufficient to kill 2500 uninoculated horses.

K. Vagedes,⁵⁸_{B. 20, H. 2, '95} studied the elimination of antitoxin in the case of a boy, 15 years of age, treated from the first appearance of symptoms by injections of antitetanic serum from the horse, in doses of 10 grammes (2½ fluidrachms) three times in twenty-four hours. Injections of the urine and serum of the patient under the skin of mice and subsequent inoculation of animals with the toxins demonstrated that the 30 grammes (1 ounce) of antitoxic serum had been eliminated by the patient by the end of eleven days and that from then on the urine showed no antitoxic properties. The serum of the patient possessed a slight antitoxic action eighteen days after injection, but it was a question whether this action depended on the antitoxin injected or on the immunity acquired by the attack of tetanus.

C. E. Douglas, of Fife,²_{No. 1765, '94} in reporting a case of tetanus treated by antitoxin, calls attention to a point of practical importance,—viz., the difficulty in dissolving the dried serum, which with cold water takes nearly half an hour,—a period which affords considerable risk of aerial contamination. The "directions" given

with the antitoxin say that it "decomposes under a temperature even a little elevated." But the normal temperature of the horse is not under 101° F. (38.3° C.). The author sees no reason, therefore, why fairly hot water—say, at 98° to 100° F. (36.7° to 37.8° C.)—should not be used, with which, it is reasonable to suppose, solution would be more readily effected and one difficulty in the administration obviated.

R. F. Weir stated to the Practitioners' Society of New York ⁵⁹_{Jan. 5, '95} that, during 1894, some 11 cases had been treated by injections by Tizzoni and others. He had records of 19 similarly treated cases,—20 with the 1 just presented,—with 4 deaths. The dried alcoholic precipitate of serum from the immunized horse or dog had been found rather insoluble, while the blood-serum itself, or the serum dried *in vacuo* into scales, which is quite soluble and permanent, has proved satisfactory. Using the latter, 9 out of 11 cases lately collected by him were cured. In great contrast to that, 95 per cent. of all cases of tetanus had died prior to the inoculation treatment. The quantity of serum injected had been from 30 to 50 cubic centimetres (1 to 1½ fluidounces) at a dose, or of the dried serum 3 to 5 grammes ($\frac{3}{4}$ to 1¼ drachms), the total amount not having exceeded 300 cubic centimetres (9½ fluidounces) in any one case.

On experimental grounds, Hewlett ¹⁵_{Apr., '95} considers the modern antitoxin treatment the most promising of any method. He recommends 20 to 40 cubic centimetres (5 to 10 fluidrachms) for the first dose, followed by 10 to 20 cubic centimetres (2½ to 5 fluidrachms) every six or twelve hours, administered by hypodermatic injection. The syringe should have a capacity of at least 10 cubic centimetres (2½ fluidrachms), to avoid multiple punctures. It should be boiled in water for ten minutes before using, to sterilize it, and all precautions should be taken to avoid sepsis. No disturbance, except urticaria, ever ensues from the antitoxin. The remedy should be administered as soon as the onset of tetanus is probable, as shown by any distinct sign, such as stiffness of the neck, difficulty in opening the mouth, or even any considerable pain at the seat of injury, coming on a few days after the accident, without apparent cause. If a favorable result is to be expected, it is imperative to employ the antitoxin as early as possible.

Kanthack, ⁹⁰_{May, '95} ⁸⁰_{July 15} in reviewing the value of the serum treatment in tetanus from a clinical stand-point, points out that the severity of tetanus and the seriousness of its prognosis depend, among other things, upon the rapidity of the onset, the acuteness of the case, and the period of incubation,—*i.e.*, the shorter the incubation, the more serious the outlook. According to Richter,

in cases of an incubation of one to ten days over 95 per cent. die, and of 717 cases 80 per cent. died. He justly states that, in estimating the value of the antitoxin treatment, we must consider closely several different points, of which the following are most important: 1. The nature and the seat of the injury. Tetanus following an injury to the head is said to be more serious, and such cases are supposed to run an acute course. 2. The condition of the wound. It seems that suppurating wounds are followed by severer spasms than slight, superficial, or clean, rapidly-healing wounds. 3. The duration of the incubation period. That has already been alluded to. 4. The rapidity of the onset. The more rapidly the spasms become general, the graver the outlook. 5. The age and general condition of the individual affected. Tetanus neonatorum and puerperal tetanus are always severe. 6. The promptness with which any kind of rational or radical treatment can be and has been applied.

In examining the results so far obtained in the so-called antitoxin treatment the author, to begin with, enumerates all the cases so far as he has been able to collect them from all the journals and from private inquiry, and without critically analyzing them. According to this table Tizzoni's antitoxin comes out best, the mortality being only 25.8 per cent. But it must be remembered that (1) only the published cases are considered; (2) all the cases have been put down without the slightest attempt at a critical analysis; (3) it appears, from Albertoni's and Rotter's statements, that the Italians have refrained from publishing some of their fatal cases. Taking out all doubtful cases, it leaves, in all, 33 *bona fide* ones, with a mortality of 25 per cent. This result would be extremely satisfactory if it were entirely trustworthy and beyond farther criticism.

In summing up, it seems to the author that the serum treatment has not actually changed the prognosis in acute and serious cases. In the milder cases it seems to lessen the spasms, the pain, and the distress, and, fortunately, it has reduced the mortality, but to what extent cannot be told until we are in possession of a larger number of cases and until we are certain that all cases are published. It is quite certain that the antitoxin is still on its trial, and that no really acute or otherwise hopeless case has yet been cured. Berger¹⁴_{Dec. 18, '95} states that the application of the Tizzoni-Cattani method is very unsuccessful in Paris, contrary to what has been reported from Italy, England, and Germany. Up to the present, the only successful cases were those of chronic tetanus of a naturally benign character. The prophylactic value of antitoxic injections is not denied however, and Berger is in favor of recognizing it.

Prophylaxis.—Nocard ³_{Oct. 23, '95}; ⁶_{Nov. 2} has conducted a conclusive experiment to prove the uselessness of antitetanic serum as a curative agent, even when combined with amputation of the inoculated part. Three long-tailed sheep each received in the tail-extremity a splinter impregnated with dried tetanus spores. At the first sign of tetanus the tails of two of the sheep were amputated at a point 20 centimetres above the seat of infection. One of these tail-amputated animals then received a dose of serum adequate for the protection of the normal animal, these injections being repeated every two hours. All three sheep succumbed without any difference being discernible in the symptoms. But the prophylaxis of tetanus opens up a more hopeful field. In certain districts of France tetanus is extremely common among horses the subjects of operations or accidents, such as castration, bites of insects, a nail-wounded hoof, tail-docking, wounds of limbs, etc. Since December, 1894, Nocard has supplied to veterinary surgeons antitetanic serum, recommending the injection of 10 cubic centimetres ($2\frac{1}{2}$ fluidrachms) behind the shoulder immediately after the receipt of a wound, operative or accidental, liable to be followed by the disease, the "vaccination" to be repeated twelve or fourteen days later. This treatment was applied to 375 animals, 327 being horses, mules, or donkeys, 47 sheep, and 1 an ox. Each received two injections at a fortnight's interval of 10 cubic centimetres ($2\frac{1}{2}$ fluidrachms) each for the large and 5 cubic centimetres ($1\frac{1}{2}$ fluidrachms) for the small beasts (sheep). In each instance the injections proved inoffensive. All the animals belonged to stables or farms where tetanus had made victims some days, weeks, or months previously, several of them had as neighbors tetanic animals, and some had been wounded at the same time and in the same manner as non-treated companions who became tetanic. Not one of these "vaccinated" animals died. Vaillard, ³⁶³_{Oct., '95}; ²_{July 20, '95} at the Académie des Sciences, after pointing out the inefficacy of antitoxin as a curative agent in any but the more slowly progressing forms of tetanus, and the necessity even here of combining removal of the nidus of infection, states that as a prophylactic it has a definite use. In animals it confers absolute immunity against the toxin, the immunity being temporary, and persisting, according to the dose employed, for two to six weeks, and longer if the injection be repeated. After inoculation with the living virus protection is certain and complete when the seat of infection is the subconjunctival tissue, but less so when the virus is introduced into the thickness of a muscle; this, the most severe form of inoculation, is followed, after one, two, or even three months of freedom from symptoms, by tetanus. The explanation is that the de-

structive action of the phagocytes on the virus is more certain and prompt in the former than in the latter. Antitoxin should, therefore, be injected as a prophylactic after any wound where there is risk of infection; for example, contused wounds fouled by earth or manure, and penetrating wounds where the foreign body has been in contact with earth. The prophylactic use of antitoxin will be specially valuable in tropical countries, where tetanus is common after slight wounds; in the tetanus of newborn infants, and in military surgery.

As a prophylactic a small dose of antitoxin (5 cubic centimetres— $1\frac{1}{4}$ fluidrachms) is regarded by Hewlett¹⁵_{Apr., '96} as sufficient. Local treatment (nitrate of silver, 1 to 100 solution, and iodine, 1 part, along with an equal weight of potassium iodide, in 100 of water) must not be omitted, and free excision of the affected part should be practiced. The patient should be placed in a darkened room and perfect quiet enforced. Abundance of easily-digested food should be administered, if necessary, through a stomach-tube during chloroform anæsthesia. Chloral is useful to induce sleep.

Bearing in mind the fact that the tetanus bacillus does not become virulent unless excluded from oxygen, W. B. Thistle, of Toronto,³⁹_{May, '96} calls attention to the necessity, in the case of punctured wounds, of opening them up freely and of thoroughly cleansing them, so that oxygen from without may enter freely and that inflammatory action in the surrounding tissue may not limit the supply of oxygen derived from the blood.

Medical Treatment.—Marie²¹²_{Mar. 10, '96; June 5} has reported a successful case in which chloral was used in the daily dosage of from $2\frac{1}{2}$ to 3 drachms (10 to 12 grammes). The most interesting point to be noted is that, with the intention of rendering the alimentary canal antiseptic, a daily dose of 45 grains (2.93 grammes) of salol was given for several days, and that after the first dose the temperature, which was at the point noted above, fell to the normal and did not again rise. It may be well, without drawing any conclusion from a single case, to note the coincidence, and inquire if this drug, which hitherto has not been used in this disease, has not some influence.

In a case treated by chloral hydrate and morphine Gussenbauer³_{June 15, '96} observed an erythema of the throat and thorax, soon developing into erythema multiforme. Eruptions are often attributed to the toxic effect of tetanic antitoxin in cases treated by that remedy; so that this case is of interest in that connection.

Oscherovski⁸⁵¹_{Mar., Apr., '96; July 20, '96} successfully treated an apparently hopeless case of tetanus by means of hypodermatic injections of carbolic acid, 12 drops of a 2-per-cent. solution being injected every three hours.

H. S. Brewer, of Chicago, ¹⁸⁶_{Oct., '94} recommends acetanilid in tetanus, with tincture of gelsemium.

E. Goodman, of St. Catherine's, Ontario, ⁸⁰_{Oct. 15, '95} has had good results from the application of ice or cold water by irrigation to the wounded part immediately after the reception of the lesion, maintaining the application for one week constantly, night and day. In every case the result was favorable. The application of cold to the lesion involving the distal extremity of the sensory nerve seemed to prevent the inflammatory condition, or the genesis of the tetanic microbe, which sets up, by reflex action in the sensori-motor centres of the spinal cord, the characteristic condition that induces the fatal muscular tonic spasms, uncontrollable when once established.

To be successful the treatment should be begun as early as possible after the reception of the lesion, and strenuously persevered with for one week, without ever allowing the temperature of the part to become elevated above the normal.

Fombarlet, ²¹²_{Dec. 10, '95} successfully treated a case, rebellious to all other measures, by means of an ether-spray to the vertebral column, as recommended by Jaccoud, ²¹³³_{p. 450, '72} continuing at the same time the internal administration of chloral. He used the Richardson spray, and at the first treatment the patient felt better. The dorsal muscles could be seen to make undulatory movements and for a few seconds recover their functions. The spray was used from three to five minutes every three-quarters of an hour, first along the spine and later over all the affected parts of the body. Improvement began from the first application of the spray.

Hydrophobia.

Pathology.—Germano and Capobianco, of Naples, ²⁶²_{Aug., '95} studied the pathological anatomy of the spinal cords of rabbits and dogs that had died of rabies. Macroscopically hyperæmia of the meninges and congestion and points of hæmorrhage in the substance of the cord were found in irregularly distributed areas. Microscopically these areas were seen to be extensively infiltrated with leucocytes along the perivascular spaces and around nerve-cells, while there was proliferation of the endothelium of the vessels. Atrophy and vacuolation of the nerve-cells, leaving open spaces in the gray matter, were also observed. The nerve-fibres showed varicosity and vacuolation of the axis-cylinder, with degeneration of the myelin sheath and increase in the neuroglia. The process, as a whole, consisted in an acute inflammation of the cord, tending to the destruction of the nervous elements and resulting in an hyperplasia of the neuroglia to replace them.

According to F. W. A. Fabricius, of New York,⁵⁹_{Dec. 28, '95} the rabic ptomaine chemically bears a striking relation to the snake-poison in certain respects; they differ physiologically, however, in important particulars. The former enters the organism from without as the result of an infection; the latter is produced in the animal carrying it and stored away in the dental canals of the fangs. The striking similarity in action of these two powerful organic poisons will be illustrated by this author in the near future, by some interesting experiments, as soon as the latter are completed.

The usual method of experimentally proving the presence of rabies is by subdural injection into the rabbit of a small portion of the medulla of the suspected animal. Keirle²¹¹_{Nov. 18, '94} recommends as simpler the hypodermatic injection into the mouse of a few drops of a solution of 2 cubic millimetres of the spinal cord from the suspected animal in a cubic centimetre of bouillon. The animal is placed in a cage communicating with a revolving wheel, which in good health he enjoys turning. When symptoms of rabies appear, however, he moves more slowly, misses the bars, and frequently halts. Nothing is easier than to recognize the disease from the changed demeanor of the mouse.

Symptomatology.—According to O. Wiley, of Salem, Va.,⁸¹_{Feb., '95} who reports a case, when the disease begins to develop, the subject or recipient of rabid saliva complains generally of pain in the seat of the bite. The wound hitherto, whether dressed or—as often happens—neglected at the time of its inception, has possibly healed over kindly and has left a scar, which in nowise differs from that which supervenes to a wound inflicted by the teeth of an animal in the best of health; just before the characteristic symptoms are about to appear, it becomes very red and inflamed. A most remarkable alteration has occurred in the appearance of the cicatrix, for all along the tract of the wound becomes very red,—almost livid,—while the skin and subjacent tissues retain their normal hue. Unlike erysipelas, this redness and inflammation do not dip into the subcutaneous cellular tissue, but are confined to the skin all along the tract of the wound.

This has been described by the older writers by the name recrudescence, and is an almost infallible indication that hydrophobia has set in, for the connection between this and the disease is most remarkable. Wiley also states that the convulsive closing of the throat is a respiratory spasm and is quite pathognomonic. The latter symptom was prominent in a mortal case reported by F. W. A. Fabricius, of New York.⁵⁹_{Dec. 28, '95}

Fatal cases of human rabies are reported by Lodge, of Bradford,⁶_{Feb., '95}; Taylor, of Dublin; Kemp,⁶_{Mar. 30, '95} Horbury, Roocrooft,⁶_{Dec. 9, '94}

and Rafter. ⁸⁰¹_{Nov. 3, '94} In Taylor's case the disease is said to have lasted seven days before death ensued,—a long period for rabies. Mayfield, of Washington, D. C., ⁸¹_{Feb., '95} in an account of a case of rabies, calls attention to the comparative absence of convulsive seizures in this disease in children.

Orokhovatz, of Lovetch, Bulgaria, ⁵⁵¹_{No. 6, '95}; ²⁶_{July 1} reports a case in which the incubation period lasted one year and four months. The patient died on the eleventh day from the appearance of the symptoms.

Grissim, of Paterson, N. J., ⁵⁹_{Sept. 15, '94} reports the case of a patient who had been bitten by a dog showing no symptoms of rabies. The man's comrades suggested to him the possibility of rabies; he began to drink heavily in order to drown his anxiety. On entrance to hospital he was morose and nervous and presented some dysphagia. Later on he could drink milk, but not water. Hysterical fits of sobbing and terror occurred; the man became delirious, and four men were necessary to hold him until he could be chloroformed and a canvas shirt be applied. During his struggles his heart's action went up to 200 and his breathing was affected. The man was bled and digitalis given, but without amelioration, and he finally died from sheer exhaustion four hours after the beginning of the delirium. A case presenting precisely the same symptoms and brought on in the same manner was reported by F. W. Fabricius, of New York, ⁵⁹_{Dec. 29, '95} but recovery ensued after a few days.

Prophylaxis and Treatment.—In an editorial ⁶_{Sept. 14, '95, et seq.} it is stated that, as early as 1889, Babès and Lepp appear to have indicated the possibility of obtaining some protection against rabies by injecting the blood of an animal inoculated against rabies (by Pasteur's method) into one previously or afterward infected by the virus. Tizzoni and Centanni, ²⁰¹¹_{Feb. 10, '95} instead of using Pasteur's method of protective "vaccination" for the animals from which the serum is to be obtained, by a process of peptic digestion attenuate the virus that is to be used. What the exact action of this digestion may be is as yet somewhat doubtful; whether it diminishes the activity of the poison-secreting organisms, kills them, or "attenuates" the ferment produced by them is a subject for careful experiment. At all events, the activity of the virus is said to be so far modified that considerable doses may be injected at a comparatively early stage of the process, and animals that have been so injected withstand the action of the more virulent virus within a comparatively short period. This part of the process is carried out upon sheep, which may be "vaccinated" again and again. These animals always retain a certain immunity,

which can be increased from time to time by fresh injections of virus, the activity of the serum corresponding to the amount and virulence of the virus injected. In these points the method of obtaining the serum is much like that by which the tetanus and diphtheria antitoxic serums are prepared. This serum, when mixed in definite quantity in a test-tube with a lethal dose of canine or fixed virus, and then injected into a rabbit, so neutralizes the poison that neither is there any increase in quantity of the virus nor are the slightest signs of rabies developed, even though the animal be kept under observation for four or five months. More important still, when an inoculation with a lethal dose of the poison is made, a comparatively small quantity of the serum serves to neutralize its effect if injected at once, and even if delayed until the end of the first half of the incubation period the amount required to be given has only to be multiplied some six or eight times. In this respect the serum has great advantages over those used in the treatment of diphtheria, in which the dose has to be multiplied some 20 or 100 times, and of tetanus, in which the increase of the dose must amount to from 1000 to 2000 times in the later stages of the incubation period. Leaving out of consideration the prophylactic properties of this serum, which could only be of use in the case of those who are constantly in contact with dogs, the success of the experiments as regards early treatment is, from a practical point of view, of very great importance. It is possible, by drying, to prepare a "permanent" form of this serum which will, if kept from air and light, remain active for a long period. It is very portable, is readily dissolved, and may be used by any one who is capable of sterilizing a subcutaneous injecting needle and syringe. The treatment, therefore, can be commenced almost as soon as the patient has received the bite, as it is not necessary that he should leave his home or his own medical attendant, with the result that the patient at once receives a quantity of the antitoxic material, which under the Pasteur method could only be manufactured in the body of the patient himself, and then in quantities sufficient to neutralize the infective material, say, after the second half of the incubation period.

One other most important point brought out by these researches is that, just as in the case of tetanic poison, the virus has a distinctly selective action; it seems to exert its full effect on the central nervous system or on some parts of it. Bearing this fact in mind and injecting the doses of serum in special positions, it is found that it is necessary to inject much smaller doses of the serum under the *dura mater* of the brain than if the injections are made into the substance of a nerve; while, when the injection is made

subcutaneously, a still larger dose is necessary than when the serum is injected at either of the above sites.

Puscarin and Vesesco, of Jassy, ²⁶²_{Mar., '95} having experienced some difficulty in drying the spinal cords of rabbits used in the antirabic treatment, experimented with spinal-cord emulsions heated to varying temperatures, and found that the virus was destroyed when subjected to a temperature of 50° to 60° C. (122° to 140° F.), its destruction being preceded by a marked attenuation. The use of heat would thus seem to be surer and more equal in its action than simple desiccation.

The following statistics of the Pasteur Institute of Paris for 1894 are given by Pottevin, ²⁶²_{July, '95}: 1392 cases treated, 12 deaths. In 5 of the mortal cases the first symptoms of rabies were evident less than fifteen days after the last inoculation. Not counting these, there remain 1387 cases with 7 deaths, or 0.50 per cent.; 3 cases, in addition, were attacked by rabies in the course of the inoculations. Out of the 1387 cases 226 were foreigners.

The statistics of the Imperial Institute of Experimental Medicine at St. Petersburg are given for 1893 by Kraïouschkine, ¹¹⁰¹_{V.3, No.2}. 486 persons applied for treatment,—the largest number thus far. Of these, 101 were judged, for various reasons, not to require treatment. In addition to these 16 had no wound, 6 were bitten by animals which were found later on to be free from rabies, and 5 refused to continue the treatment. This makes the total number of patients 358, of which number 4 died, 1 during the treatment. Excluding this case, the mortality was 0.84 per cent.

From the annual report of the Odessa Antirabic Institute, as given by Diatropow, ¹¹⁰¹_{V.4, No.1, '95} it appears that, during 1894, 984 persons were treated, 42 of whom had not been bitten, but had been in danger of infection, either while treating men or animals suffering from the disease or in making autopsies of animals succumbing to it. The mortality was 0.21 per cent.

According to figures given by Bordoni-Uffreduzzi, ²⁶²_{Oct.23, '95} the average mortality in the Antirabic Institute of Turin, from 1886 to 1894, inclusive, was 0.95 per cent. Among 222 persons treated in 1894 there were no deaths. From experimental evidence it would appear that alcohol has a slightly attenuating influence upon the virus contained in the spinal cords of rabid animals. Freezing, however, does not destroy, but preserves, the rabid virus.

Tonkin, of Kano, Western Soudan, ⁶_{May 12, '95} states that, when a native of that country is bitten by a rabid dog, the animal is at once killed, the liver removed, slightly browned before a fire, and eaten by the patient. He notes a similarity between this treatment and the Pasteur method. Shrubshall, of London, ⁶_{May 25, '95} in

commenting on this, states that in Northern China a similar custom obtains, though there the heart is eaten instead of the liver.

Septicæmia.

Pathology.—In a contribution to the study of septic diseases, Pfister, of Zurich, ²²⁶ ⁸¹⁴ gives an elaborate study of the pathological examination of a case of sepsis occurring in a young woman, which originated from a small wound of the hand with scarcely any local inflammation, and resulted in death with extensive supuration in the muscles, a myocardial abscess, subperiosteal and subcutaneous abscesses, slight pleurisy, suppurative arthritis of the knee, and metastatic ophthalmia and bursitis, besides a parotitis. The bacteriological examination showed the invader to be the streptococcus, and the method of invasion to be that unusual form of growth of the organisms in the blood-vessels—not in emboli, but actually upon the walls, called by Klebs “endothelial mycosis.” Clinically the case belongs to the rare group in which the muscles are mainly attacked, called by Nicaise “myosite infectieuse.” The examination of the kidneys and of the parotids was especially interesting. In the kidney the microscopical examination appeared to prove beyond doubt that the micro-organisms existed both in the vasa recta and the straight uriniferous tubules,—a point hitherto much disputed. In the parotids, while there was an abscess only upon one side, on the other the salivary ducts were found to be infected with micro-organisms, although there seemed some doubt whether these were streptococci or staphylococci, and the proof appeared positive that the parotitis was due to an infection through the mouth, not by the blood-vessels, although cocci were found in these also, as elsewhere in the body, and hence the inflammation must be considered as indirectly, not directly (by internal channels), the consequence of the general sepsis.

S. Arloing and E. Chantre ⁶ ^{Nov. 16, '95} state that there exist close etiological relations between surgical purulent infection, puerperal septicæmia, and erysipelas, but we are still ignorant of the place and the mode in which the streptococcus acquires the pathogenic properties which cause it to produce the one or the other of these several states. The authors find that the micrococci have a disposition to form bacilli in conditions still unknown or badly determined either within or without the organism. The virulence of the bacilli is liable to the same variations as that of the streptococcus. Lastly, it is not necessary to conclude that there is a mixture of a pyogenic agent with a foreign microbe when bacilli are found commingled with streptococci, for the bacilli may only be modified streptococci.

Etienne ³⁶⁰_{Oct., '95} records two cases of general infection with the staphylococcus without definite visceral manifestation or other distinct localization. He refers especially to cases in which the generalized infection reveals itself by severe general symptoms, profound debility, and a characteristic temperature-curve. The disease appears to be rare, these two cases being the only ones which the author has seen.

The investigations of Sittmann, of Munich, ³⁴_{Jan. 15, '95} prove conclusively that in septico-pyæmia the germs of suppuration are always found in the circulating blood, although in small numbers, and that their demonstration furnishes the most positive evidence in the diagnosis of this affection. The character of the organisms found may be of value in prognosis. The best prognosis can be made when staphylococci are found, less favorable if pneumococci are demonstrated, and least favorable if streptococci are present or in mixed infection. The bacteriological examination of the blood will furnish, in cryptogenetic septicopyæmia, the source of infection. Thus, if we find pneumococci we look to the lungs as the source of infection; if the bacterium coli, we look to the intestines, biliary passages, or a cystitis.

Adolf Dennig, of Tübingen, ³²⁶_{July, '95}; ¹⁵_{Sept., '95} believes that many cases classified as articular rheumatism are really septic in origin,—nay, more, that the exciting cause of acute articular rheumatism may be entirely a pus-microbe accidentally modified by external circumstances. Sahli has found a coccus, closely related to staphylococcus citreus, in the affected joints, pleura, pericardium, etc., in uncomplicated articular rheumatism, and he asserts that articular rheumatism is referable to infection with pus-cocci of a weak culture. Leube goes farther, and attributes muscular rheumatism to a similar cause. Treatment consists primarily in disinfection of all wounds, tonic treatment, and absolute rest in bed until the temperature has been normal for some time. Albuminous diet and a moderate amount of alcohol should be given. Mercurial inunctions have been recommended by von Ziemssen. For cardiac adynamia, alcohol, coffee, camphor, ether, etc. Phenacetin, in doses of 8 grains (0.52 gramme) several times daily, is good for joint-pain. Diuretin is useful in kidney affections. Hot baths should be used for uræmia.

W. S. Christopher ¹¹⁷⁰_{Apr., '95} mentions numerous febrile processes met with clinically which cannot be referred positively to any known source. Such processes are found much oftener in children than in adults, and it is consequently in this field of work that the anomalous fevers may be studied to the best advantage. It is quite proper to include these anomalous undifferentiated fevers

under some generic term, and he therefore suggests "medical septicæmia."

Treatment.—Michaux, of Paris, ¹⁴_{Jan. 12, '96} discussed the value of intra-venous injections of serum in post-operative septicæmia, and described two cases in which the method proved advantageous. He used either Hayem's solution or simply salt water in quantities varying from 800 to 1200 grammes (25 to 38 fluidounces) and rarely as much as 2000 grammes (64 fluidounces). He believes that it was of great importance to prevent the entrance of air into the vein. Immediately after the injection it will be seen that the respiration has become fuller and that a marked tonic effect has been produced. Generally no untoward symptoms follow immediately after the injection, though he noted later on in one case the occurrence of serous vomiting and some disturbance of the cerebral circulation; in another case an embolism followed, which, however, Michaux could not attribute to the injection. He regarded the artificial serum as an excellent resource to which should be added all the others at our disposition.

Monod, in discussing Michaux's paper, stated that he had used the injections in several cases of hæmorrhage and shock, and in doses of from 2000 to 3000 grammes (64 to 96 fluidounces) obtained very good results. Routier, however, could not say the same, for in 1888 he had injected 600 grammes (19 fluidounces) of serum into the basilic vein, death following within a few hours.

Furunculosis.

Brocq ²¹²_{Feb. 10, '96} remarks that gouty patients who have neither diabetes nor albuminuria are frequently troubled with furunculosis. This condition is best treated by the prolonged use of the extract of colchicum of 0.03 to 0.04 gramme ($\frac{1}{2}$ to $\frac{2}{3}$ grain). R. Antoniewicz, ²¹_{No. 13, '95} in cases of furuncle from twenty-four to forty-eight hours old, takes a drop of crystallized carbolic acid on the point of a sound, heats it to the melting-point and presses it on the furuncle, rubbing it slightly. Pain ceases on the second day, and no further treatment is required. In cases three or four days old carbolic acid does not abort the disease, but it does change its course, rendering suppuration painless. (Report of Corresponding Editor Drzewiecki, Warsaw, Poland.)

Camphorated salol, prepared by moistening 1 part of camphor with a few drops of alcohol and rubbing in a mortar with 1.4 parts of salol until a transparent fluid is obtained, has been found by Elsenberg ⁴⁵_{'96}; ⁹⁹_{Sept. 19, '96} of especial value in furuncles and carbuncles. A change takes place in from twelve to twenty-four hours; the pain diminishes, the redness and inflammation of the

adjoining parts disappear, and the tumor becomes progressively smaller without the formation of pus.

Gobert, of Lille, ²²⁰_{Aug. 10, '95} reports four cases of furunculosis treated by beer-yeast, one teaspoonful night and morning. The effects were soon visible; the development of fresh furuncles was arrested in a few days, the old one became cicatrized, and the general condition of the patient improved so that he could walk and sleep. The remedy was continued for a couple of weeks, at the end of which time recovery was complete.

Shock.

H. Roger ⁴¹⁰_{Oct., '94} ²¹³_{Jan., '95} has noted the interesting fact that in frogs during the condition of shock (say, from a Leyden jar) the spinal cord is insensible to the action of strychnine and the muscles to that of veratria. This is not due to absence of absorption nor to disturbance of the central or peripheral circulation. The poison is absorbed, circulates in the blood, and yet shows no effect; either the tissues are unable to react—which is improbable, especially in regard to the muscles—or the poison does not pass from the vessels to the tissues. This observation may be regarded as an extreme instance of the well-known fact that in shock strong remedies—stimulants, for example—do not exercise their usual influence upon the system.

In a note on the etiology and pathology of shock, Eugene Boise, of Grand Rapids, Mich., ¹⁰¹_{Jan., '95} states that the weight of evidence favors the theory that the pathology of surgical shock is hyperirritation of the entire sympathetic system rather than either local or general vasomotor paresis.

J. Likorsky, ³¹_{Aug. 31, '95} in a study of pain, fear, and shock, finds, like many other observers, that, though apparently widely different, these conditions have much in common. Shock and pain are always accompanied by the following series of constant phenomena: 1. Alteration of the pupils. Mydriasis is a reflex symptom due to excitation of the sensitive nerves, and is always present in any painful irritation. 2. Weakness of the voluntary muscular system,—inhibition of the motor centres due to painful irritation of the sensitive nerves, and analogous to the arrest of the respiratory muscles on the affected side in pleuro-pneumonia. 3. Modification in respiration, also due to the same cause. 4. Cardio-muscular symptoms, the vasomotors being especially sensitive. Painful irritation of the sensitive nerves causes a vascular spasm, soon followed by vasomotor paralysis. This in turn leads to a fall of blood-pressure and diminishes the number and strength of heart-beats. 5. Alterations in nutrition and body-temperature.

These depend on trophic troubles due to shock or pain. Arrest of nutrition exchanges leads to respiratory disturbance, the blood being too poor to properly stimulate the respiratory centres. 6. Alteration in the psychical functions. These, like the physiological functions, are more or less depressed in shock; even pain, the primary manifestation, is much diminished,—a fact which led Dupuytren to remark that a too great loss of sensibility could cause death as readily as a too great loss of blood.

W. L. Estes, of South Bethlehem, Pa., ⁷⁸⁷_{Nov., Dec., '94} advocates the doctrine of acute anæmia as the primary and cardinal feature of surgical shock. Statistics support this view. The mortality-rate after amputations, in his experience, has been reduced a little more than 50 per cent. by the use of tourniquets immediately after crushing injuries to the extremities and by waiting for the patient to recuperate from the immediate effect of a large loss of blood before amputating. During the last two years this theory has been rigidly carried out by him; except in one instance, and that instance furnishes the only case of death following single major amputations in St. Luke's Hospital, at Bethlehem, during the last two years.

Venomous Wounds; Snake-Bites.

Pathology.—With reference to the action of snake-venom, G. B. Halford, of Melbourne, ²⁰⁵⁰_{'94} repeats a statement, formerly made by him, that the venom acts primarily on the blood, and, secondarily, on the nervous system. The effects of the poison on the blood may be seen in the non-coagulation of the latter and in the production of large cells.

Brenning, ²⁰⁵¹_{'96} however, considers the large cells found by Halford to be merely altered leucocytes, and is inclined to think that the poison acts directly on the nervous system, causing, after a short period of irritation, paralysis of the respiratory centre. That the blood-changes are not the cause of the symptoms of poisoning is demonstrated by the fact that frogs whose blood has been replaced by a saline solution at 0.7 per cent. present the same symptoms.

Phisalix and Bertrand, ¹⁴_{Dec. 5, '94} ⁶_{Dec. 8, '94} whose researches on the venom of snakes had previously shown that the blood of these animals contained toxic principles analogous to that secreted by the poison-gland, now state that the ablation of the poison-glands in forty-six vipers from the Jura, the Puy-de-Dôme, la Vendée, and the neighborhood of Paris, determined a distinct diminution of the toxicity of the blood (inoculated into fifty-eight guinea-pigs). It is evident that a part, at least, of the poison present in the blood

is derived from the re-absorbed secretion of the special poison-glands. The internal secretion of glands thus receives a fresh confirmation.

Treatment.—Calmette, of Lille, ^{July 20, '96} expresses his willingness to supply samples of the serum prepared by him (see ANNUAL of 1895, vol. iii, page M-14) to physicians wishing to try it. This serum is taken from an immunized ass or a horse. Its immunizing power is, at least, 10,000; that is, an injection into rabbits of a quantity of serum equal to $\frac{1}{10000}$ of their weight enables them, one hour afterward, to support, without signs of poisoning, a dose of 0.001 gramme ($\frac{1}{64}$ grain) of dry venom of *Cobra de capello* of medium activity, the same dose being sufficient to kill control rabbits in less than four hours. If injected in sufficient quantity into persons bitten by snakes, the serum prevents the action of the venom, provided intoxication is not too far advanced. It must be injected as soon as possible after the bite. Generally it is efficacious an hour and a half after the bite in adults, who rarely die before three hours have elapsed after the bite of the most venomous species of snakes. The serum is active against the venom of all snakes. The dose varies according to the species of snake, the age of the person bitten, and the time of administration. Generally 10 cubic centimetres ($2\frac{1}{2}$ fluidrachms) are sufficient for children under 10 years, and 20 cubic centimetres (5 fluidrachms) for adults. However, when the bite is that of a very dangerous species,—such as the *Cobra de capello*, the *Naja haji*, the *crotalus*, and the *bothrops* of the West Indies,—it is advisable to give one single injection of a double dose at once.

The first precaution to be taken is, as usual, to tightly bandage the bitten limb as near as possible to the bite and between the latter and the trunk. The wound is then to be washed with a solution of hypochlorite of lime diluted to 1 gramme ($15\frac{1}{2}$ grains) per 60 grammes (2 fluidounces) of previously-boiled water. The dose of serum must be injected into the subcutaneous cellular tissue in the right or left side of the abdomen, and with the usual antiseptic precautions. Then, with the same syringe, 8 or 10 cubic centimetres (2 or $2\frac{1}{2}$ fluidrachms) of the 1 to 60 solution of hypochlorite of lime are to be injected in the different parts surrounding the bite and into the bite proper. These injections are intended to destroy, in and around the wound, the venom which has not yet been absorbed. After these procedures the bandage can be removed from the limb, the patient rubbed, given coffee or tea, and warmly covered, so as to cause abundant perspiration. The administration of ammonia or alcohol must be avoided; it would only be injurious both to the patient and to the treatment

by the serum. It is also unnecessary to cauterize the bitten limb either by the thermo-cautery or by chemical substances.

G. Phisalix and G. Bertrand, ³June 19, '95 from a series of carefully-conducted experiments, conclude that solutions of chloride of lime, advocated for the bites of venomous serpents, possess no immunizing action, but purely a local effect. The agent may destroy the venom at the spot, but its chief action is to cause mortification of the tissues and prevent absorption of the toxic substance. It must therefore be concluded, from a practical stand-point, that injections of chloride of lime made at other points than that of the wound should be avoided; and if the antidote be used it should be injected into the region of the wound deeply rather than immediately under the skin.

Calmette, on the contrary, claims that chloride of lime prevents the poisoning of the system when injection is made deeply into the tissues in the region of the bite. Many other experimenters have, according to him, observed the same results. Injections of a solution of purified hypochlorite of lime—about 0.8 litre ($\frac{4}{5}$ quart) of chlorine to 1 litre (1 quart)—do not give rise to eschars, either in man, the horse, dog, rabbit, or donkey; they do sometimes cause them in the guinea-pig.

Two cases in which the use of the remedy produced favorable results are reported from Australia. In that described by Hodgson ²⁸⁵Dec. 20, '95 the patient was bitten in the left forefinger. A ligature was placed around the base of the finger and suction applied to the wound. Doses of 20 minims (1.3 cubic centimetres) of a 1 to 60 solution of chloride of lime were injected into the finger, the back of the hand, and the front of the wrist; 100 minims (6.4 cubic centimetres) were injected into the arm, 60 minims (4 cubic centimetres) into the right calf, and 80 minims (5.2 cubic centimetres) into the right forearm. Though the injections caused great pain, the patient recovered. In Mackenzie's case, ²⁸⁵Dec. 20, '94 one hour after the bite, 30 minims (2 cubic centimetres) of a 1 to 12 solution of chloride-of-lime, prepared for four days, were injected into the left leg, and, in all, twenty-five injections were given at intervals in different parts of the body. No local irritation ensued and the patient recovered.

With reference to the treatment of snake-bites by subcutaneous injections of strychnine salts, R. H. Elliott ²Apr. 20, '96 gave to the South Indian Medical Association an account of a series of experiments on animals. Drops of venom were obtained from cobras and injected, in a saline solution, into the subcutaneous tissues of the abdomen. Animals of various kinds were used,—frogs, pigs, guinea-pigs, dogs, and monkeys. The minimum fatal dose of

cobra-poison and the rapidly fatal dose were ascertained for each variety of animal, and the full physiological dose of liquor strychninæ (B. P.) solution when given hypodermatically. In thirty cases in which the antidote was used there was not one recovery. Either the animals did not survive any longer with the antidote than without it or in some animals the effect was even unfavorable. Elliott concludes that subcutaneous injections of strychnine often hasten death and never materially retard it. This evil effect of strychnine has two causes: 1. By increasing the force and frequency of the circulation, and thus aiding the diffusion of the virus. 2. By an exhausting action on the nervous system.

Elliott considers as important the observation of Misra, that strychnine seemed to be useless in cases in which speech was affected. As this was a characteristic symptom of snake-poisoning, it would indicate that many cases where it had been missing and in which strychnine had been of use were not really cases in which poisoning had taken place.

Joshua Duke,²⁰⁶_{No. 6, '95} in a study of thirty-seven cases of snake-bite, states that Mueller, who introduced the hypodermatic use of strychnine for snake-bite, declares that its action is regular and prompt, and after a time stops entirely. The snake-poison develops regularly, but remains latent for some time, so that, when it has been apparently conquered for a time, it may suddenly start on a new course of symptoms. The strychnine injections should not be employed until unmistakable symptoms of snake-poison are perceptible, for it may act so slowly that the patient succumbs before the state which requires and neutralizes the action of the strychnine has developed. The patient must be watched for twenty-four hours after the disappearance of the last symptoms, in order to be able to combat, in time, a sudden relapse. Of the thirty-seven cases, recoveries took place in 67.5 per cent. Of these cases, eight were treated by Banerjee, of Pachbadra, India, all of which recovered; in some cases the amount of strychnine was enormous (3 to 4 grains during a period of four days). He employs the nitrate of strychnia in $\frac{1}{15}$ -grain doses, repeated about every two hours.

The conclusions reached by Duke are that the hypodermatic injection of strychnia is the only remedy to be relied upon; these must be carried out with boldness, but only after the symptoms of snake-poison have become pronounced. If a proper amount of snake-poison to counteract the strychnia is not present in the blood, the latter may itself cause death. If the patients are moribund when seen,—*i.e.*, pulseless and respiration having ceased,—the intra-venous method may be adopted. Although experience

proves much in its favor, the remedy cannot, at the present time, be considered a certain cure for the poison of all the colubrine and viperine snakes which inhabit the Indian peninsula.

Cases in which the strychnine method was successful were recorded by Alvah Stone, of Worth, W. Va. ⁸¹July, '96; M. Perceval, of Queensland ⁶Mar. 23, '96; Ernest Humphry, of Queensland ²⁴⁷Mar. 15, '96; Ram Dhary Sinha, of Khalpoorah, India, ¹⁰⁵⁵Nov. 1, '96 and S. E. Prall, of Bijapur. ²⁰⁶Oct., '94

[The experiments of Elliott should not be looked upon as capable of counteracting the value of the clinical evidence presented. A faulty technique, some chemical change unknown to the experimenter, etc., may have caused the results obtained to be quite misleading.]

G. Roux ¹⁴June 14, '96 recommends potassium permanganate, a 1-per-cent. solution being injected into the wound. Permanganate of potassium was successfully used by J. C. Bankson, of Montcalm, La. ¹⁸⁶Sept., '96; J. K. Cissell, of Loretto, Ky. ¹⁸⁶Aug., '96; F. W. Maloney, of Rochester, N. Y. ⁵⁹Nov. 3, '94; W. T. Bertrand, of Leiter's Ford, Ind., ¹¹⁶³Sept., '96 and E. G. Goodman, El Paso, N. C. ⁴³Jan. 5, '95

Sawyer, of Greensboro, Ala., ¹⁴³Oct., '96 recommends the tincture of *Asclepias verticellata* (Linn.), var. *pumila* (Gray), against snake-poisoning and the bites of rabid animals. The weed is used for this purpose by the natives of St. Clair County, Alabama.

G. Roux ¹⁴June 14, '96 advises the use of the dry cup instead of the mouth to exercise suction upon the wound. That serious effects may follow in a person who performs suction of a poisonous wound is shown by a case published by Hirschhorn. ¹¹³No. 30, '96 After applying suction to the wound of a girl bitten by a viper, a man experienced a painful swelling of the left submaxillary region extending to the neck, the chest, and the upper extremity. Vertigo, inability to stand, and clonic and tonic spasms of the left side of the body occurred, and an exanthema resembling urticaria was present for two hours. Examination showed that inoculation had taken place through a lacerated gum, a tooth having been extracted shortly before.

Miscellaneous Venomous Wounds.

Scorpion-Stings.—H. Henderson, of Colingapatam, ²³⁹Nov. 1, '96 states that he has obtained uniform success, and in a large number of cases, from the ordinary creeping grass, generally used for foddering horses, known in India as "haribali" grass (*Arum pili*). The tender stalks and blades are crushed in a mortar or between two stones, a little water being added if the stalks are rather tough, and about a teaspoonful of the juice, strained through a

coarse muslin, is inserted into either nostril of the patient. The effect is immediate. All pain ceases and the patient is able to proceed about his work at once. There is no feeling of nausea or inconvenience of any kind after the administration of the remedy. The author suggests that tobacco might also possess value thus employed.

[This clinical observation and another, omitted owing to insufficiency of details, are particularly interesting, especially if compared with other conditions in which reflex action from the nasal mucous membrane seems to play an important part through the pneumogastric, and would tend to indicate that this nerve bears the brunt of the toxic influence. The greatly increased travel in the direction of Egypt, where scorpions are so numerous, warrants the insertion of these therapeutic indications.—Ed.]

Vinze, of the East Indies, ³_{V.15, No. 222, '95} highly extols applications of camphorated chloral (equal parts of camphor and chloral hydrate). This mixture gives almost instant relief from the acute pain produced by the venom of the scorpion, it is stated. It only remains to combat the symptoms of collapse which supervene in some cases, and for this purpose milk and brandy are recommended.

Spider-Bites.—Guibert ¹_{Mar. 9, '95} cites two cases in which symptoms of a serious nature followed spider-bites,—cramps, convulsive trembling, and disturbances of variable gravity involving the neuro-muscular system only, followed by gastro-intestinal and renal symptoms. In the first case the stools presented an hæmorrhagic appearance; in the second there was, in addition, hæmaturia. R. H. Lewis, of Kinston, N. C., ¹_{Nov. 10, '94} states that he was himself bitten on the glans penis by a spider. Very soon intense pains manifested themselves, with contraction of the abdominal and thoracic muscles. Delirium was present for a short time. The pains, after being general, became localized themselves in various regions, changing from place to place, and it was eight days before he had recovered.

Taylor, of Denver, ⁸⁰_{May 15, '95} treated a woman who showed severe symptoms after the bite of a large tarantula, which she had killed in her bed. The author used injections of $\frac{1}{60}$ or $\frac{1}{90}$ grain of strychnine, according to Mueller's method. The first injection, in addition to the strychnine, contained $\frac{1}{100}$ grain of trinitrin. The result was excellent. Charles Forbes ²²_{Oct. 16, '95} also employed hypodermatic injections of strychnine with success in tarantula-bites.

Bee-Stings.—Marquie ²¹²_{Dec. 10, '95} reports a case in which death followed a bee-sting. The individual had some time before been made very ill by a bee-sting, the inference being that he was the subject of an idiosyncrasy against this particular form of venom.

Penniman, of Argyle, Ill., ⁹ Apr. 20, '95 saw a case in which general symptoms followed and an urticarial rash appeared over the entire body after a bee-sting. Vinze ³ v. 15, No. 222, '95 states that camphorated chloral is extremely efficacious for the arrest of the severe pain caused by bee- and wasp- stings.

Burns.

Speaking of the mortal changes induced in the internal organs by superficial burns, Oscar-Silbermann, of Breslau, ³¹⁹ ¹⁵ No. 20, '95; Oct., '95 has found them, by microscopical examination, to be due to stases, thromboses, thrombo-emboli, etc., produced by agglutination of the red corpuscles, blood-fragments, discs, and leucocytes. Vascular occlusion was commonest in the lungs and kidneys, then in the liver, and rarest in the brain and subcutaneous tissue. The question whether the clinical symptoms after burns are in accordance with the above results must now be considered as decided. The dyspnœa, cyanosis, anuria, coma, vomiting, melæna, especially the depression of aortic pressure, are readily explained by the numerous occlusions of the pulmonary capillaries, and the resulting venous stasis on the one hand and arterial anæmia on the other. The frequent involvement of the lungs, especially in man, is proved by the statistics of Schjerning and Seeliger, who found lung complications 87 times in 125 dissections.

The mechanism of death from burns has been studied by Roger, ¹¹⁵³ ^{May, '95} who finds that, in cases where a fatal result supervenes within a few hours, complete sideration of the nervous system has taken place, irritation of the nerve-terminations having produced a series of inhibitory acts in the organism (inhibition theory of Brown-Séquard and Roger). The gases of the blood diminish markedly, as shown by the researches of the author in conjunction with Guinard. ³ ^{Nov. 3, '94} As regards the asphyxia that is said to be produced by these blood-changes, the authors found that, while the total quantity of gas in the blood was diminished, the carbonic acid was diminished even more than the oxygen, showing that there was an arrest of metabolism, but not asphyxia.

In studying the toxicity of the urine of dogs in which one side of the body had been scalded, they found that urine of these animals killed rabbits when injected in the proportion of 147, 81, 70, 12, and even 9 cubic centimetres to each kilogramme of body-weight. The urine was diuretic; caused torpor, at times alternating by spasms and convulsive phenomena; contraction of the pupil, exophthalmos, and dyspnœa. The urine of men who had been burned produced the same effects. The authors conclude that the organism of a burned person manufactures toxins in large

quantity and of characteristically noxious quality. These are produced by tissue that is destroyed, or in process of destruction, by changes in the tissue-juices, and especially by blood-changes, as noted by a number of authors.

Treatment.—Thierry, of Paris, ²⁶_{Dec.2,'95} having twice, while working with a picric-acid disinfectant, dropped burning matter upon his hand, and been astonished at the absence of pain, was led to make experiments with the view of ascertaining whether the acid could account for the phenomenon. He has come to the conclusion that when a saturated solution of picric acid is applied to a burn or scald, not only will it obviate all pain, but it will also prevent the formation of an ulcer and in a few days bring about perfect cure.

Louis Filleul ⁷⁴⁷_{Dec., '95} also recommends picric acid. According to this author, a remedy for burns must be analgesic, antiseptic, and keratogenous,—three qualities possessed by picric acid in solution 1 to 200. Its use is also free from the accidents sometimes provoked by antiseptics, as it is neither irritant, caustic, nor toxic. It is, therefore, the dressing of choice in extensive superficial burns. Filleul advises the use of a solution obtained by adding the crystals of picric acid to boiling water, the excess being removed by decantation. The golden-yellow solution thus obtained is left to cool in a vessel corked with cotton to insure asepsis. Compresses of tarlatan previously boiled to remove the stiffness, or clean linen of any kind, are dipped in boiling water, then in the solution, wrung out, and applied in several thicknesses over the burned areas.

A. Bidder, of Berlin, ²¹⁹_{May,'95} ¹_{June,'95} highly recommends thiol for burns of all degrees. He first washes the burned part with a weak solution of corrosive sublimate and then removes the cuticle hanging loose as the remnants of ruptured blisters, taking care not to touch those of which the walls are still intact. After dusting the burn with powdered boric acid, the entire surface of the burned region and the healthy skin around it are painted with a solution of equal parts of thiol and water; finally, a layer of greased cotton is laid on the burn and kept in place with a bandage. Thiol allays the pain very rapidly and arrests the hyperæmia of the skin.

P. Giraudon, of Paris, ²⁰⁰⁰_{No.500,'95} also regards thiol as an excellent topical remedy, when used with an occlusive dressing. The results in burns of the second degree are really surprising, no trace of the burns remaining after recovery. The results are also excellent in burns of the third and fourth degree, suppuration and cicatrices not being observed when the remedy is used.

Leo Leistikow ²⁸_{Nov.1,'95} ²_{Dec.7,'95} has, during the last six years, used

ichthyol in the treatment of burns of the first and second degree with the best results. Its application at once eases pain and the anodyne effect is lasting. The author uses it in powder, in paste, or in salve-mull, the zinc-ichthyol salve-mull being most serviceable in circumscribed burns of the first and second degree, particularly of the face and extremities. The dressing should be changed once every twenty-four hours. The powder is most useful in extensive burns of the first degree on the trunk, and it must be sprinkled thickly and frequently on the part. The paste is used in extensive burns of the second degree; when there is much inflammation it is advantageously combined with the powder treatment. The formula of the powder is

R	Zinc oxydat.,	20.0
	Magn. carbonic.,	10.0
	Ichthyol.,	1.0 to 2.0

That of the paste is

R	Calcar. carbonic.,	10.0
	Zinc. oxydat.,	5.0
	Amyli,	10.0
	Ol. zinc.,	10.0
	Aq. calcis,	10.0
	Ichthyol.,	1.0 to 3.0

INDEX TO VOLUME THIRD.

By N. I. DEVEREUX,

PARIS.

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633. Revista de laringología, otología y rinología, Barcelona.
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